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COMMERCIAL FISHERIES REVIEW

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COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries
prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor
H. M. Bearse, Assistant Editor

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RESULTS OF EXPLORATORY SHRIMP FISHING OFF WASHINGTON AND OREGON (1958)

By Dayton L. Alverson,* Richard L. McNeely,**
and Harold C. Johnson***

SUMMARY

The ocean pink shrimp fishery off Grays Harbor, Wash., which began in 1956, expanded rapidly following the introduction of mechanical shrimp peelers. Landings in Washington increased from 40,000 pounds in 1956 to an estimated 6.5 million pounds in 1958. To further help the growth of that fishery, four exploratory cruises were conducted off the coasts of Washington and Oregon during 1958 with the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb.

Explorations extended from Cape Beale, Vancouver Island, B.C., to Newport, Oreg. During the four cruises a total of 233 otter-trawl drags was made at depths ranging from 49 to 275 fathoms. Off the Washington coast, good catches were made between Destruction Island and LaPush; and moderate catches were made northwest of Cape Flattery. Off Oregon, commercial concentrations of ocean pink shrimp (Pandalus jordani) were located west of Tillamook Head, Manhattan Beach, and Cape Lookout. Trawling off Tillamook Head yielded catches at rates up to 2,800 pounds heads-on shrimp an hour.

Drags between 61 and 90 fathoms resulted in the highest catch rates, although fishing was also productive between 91 and 120 fathoms. Green mud or green mud and sand bottom characterized areas in which good shrimp catches were made. Bottom temperatures ranged between 42.1 and 46.7 degrees F. in the areas fished.

Fish taken during shrimp trawling included predominantly smelt, small "soles" and eelpouts. On one occasion 4,000 pounds of dogfish were taken in a half-hour drag.

A fishery for ocean pink shrimp (Pandalus jordani) began off Grays Harbor, Washington, in 1956. Expansion of the fishery followed the introduction and successful use of mechanical peeling machines in the fall of the same year. The machines lowered the cost of processing and increased the capacity of processing plants. Subsequently, the demand for shrimp increased, and catches of ocean pink shrimp in Washington increased from 40,000 pounds in 1956 to 2.3 million pounds in 1957 (Robinson et al 1958). Preliminary data indicate that the ocean pink shrimp catch for 1958 exceeded 6.5 million pounds.

An excellent demand for the "cocktail-size" shrimp resulted in an increase in the number of vessels participating in the fishery: from 5 trawlers in 1957 to about

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25 trawlers in 1958. It was soon evident that the relatively small area being trawled would not fulfill the needs of the expanding industry. For this reason, four exploratory cruises were conducted during 1958 aboard the U. S. Bureau of Commercial



Fig. 1 - The U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb.

Fisheries vessel John N. Cobb (fig. 1) outside the area of the known commercial fishing grounds. The cruises, carried out in cooperation with the fisheries agencies of the States of Washington and Oregon, were designed to acquire information concerning sizes, quantities, and availability of shrimp inhabiting offshore waters from northern Washington to central Oregon. The 1958 exploratory shrimp work began in March and terminated in November.

BACKGROUND

The earliest shrimp fishing on the Pacific Coast of the United States reportedly began in San Francisco Bay during 1869 (Bonnot 1932). Italian fishermen with small beach seines fished the shallow waters of the southern bay for two species of small brown shrimps (Crangon

franciscorum and Crangon nigricauda). Several years after the inception of that fishery, Chinese-American fishermen introduced a set net which proved superior to seines and became the major method of capture. The brown shrimp fishery has persisted since its inception, and production varied between 0.25 and 1.7 million pounds annually (California Division of Fish and Game 1949). Until recent years, California shrimp fishing remained an "inside" fishery and failed to expand to coastal regions, except for a small pot fishery for spot shrimp (Pandalus platyceros) that was attempted by Monterey fishermen during the early 1930's. Difficulties in fishing deeper than 100 fathoms, the depth at which the shrimp were found, and heavy trap losses due to a severe storm proved costly, and that fishery was eventually discontinued.

A fishery for the two species of pink shrimp (Pandalus jordani and Pandalus borealis) began in Puget Sound in about 1888 (Smith 1937), and as in the early California fishery, beach seines were used to make the catches. Beam trawls pulled by steam tugs soon replaced seines, and after the turn of the century the fishery expanded rapidly. Smith (1937) reports that over 429,000 pounds of Pandalid shrimp were landed from Puget Sound in 1903, and catches remained good between 1903 and 1915. Between 1915 and 1922, the catch fell off and remained at a low level until the development of an offshore shrimp fishery in 1956.

PREVIOUS EXPLORATORY FISHING: Shrimp explorations conducted by State and Federal research agencies have played an important role in initiating the offshore shrimp fisheries of the Pacific Coast. Between 1950 and 1953, the California Department of Fish and Game carried out offshore shrimp explorations between Los Angeles and Crescent City, Calif. (Squire 1956). Those explorations located commercial concentrations of ocean pink shrimp in six areas. Best catches were made off the northern part of the State between Bodega Bay and Crescent City.

The Oregon Fish Commission initiated shrimp explorations in the fall of 1951. A total of 80 drags was made between the Columbia and Rogue Rivers (Pruter and Harry 1952) and catches of ocean pink shrimp were reported from "practically all areas explored where the bottom consisted of green mud and where the depths ranged between 60 and 80 fathoms." That report suggested that shrimp were present in sufficient quantities to support a commercial fishery.

Explorations off the west coast of Vancouver Island were begun in 1955 by the Fisheries Research Board of Canada. Using a small otter trawl, 150 experimental drags were made at depths between 48 and 112 fathoms. Best results were reported off the mouth of Nootka Sound, west of Esteban Point, Vancouver Island. The investigators concluded, however, that "shrimp were not present in sufficient quantities to support a fishery" (Butler and Dubokovic 1955b). Investigations conducted by the Canadians along the east coast of Vancouver Island resulted in reports of commercial concentrations of shrimp in the bays and the inlets of this area (Butler and Legare 1954, Butler and Dubokovic 1955a).

During the fall of 1955 and the spring of 1956, the U. S. Fish and Wildlife Service, in cooperation with the State of Washington Department of Fisheries, conducted explorations to determine the species and availability of shrimp off the Washington coast (Schaefers and Johnson 1956). Exploratory fishing was carried out between Cape Alava and Willapa Bay. Excellent catches were made off Grays Harbor at depths between 60 and 85 fathoms. A further contribution resulting from those explorations was the introduction of the Gulf shrimp trawl as an efficient gear for capturing ocean shrimp on the Pacific coast (Stern 1957).

The exploratory work conducted by those fisheries agencies led to the development of the commercial shrimp fisheries, and ocean pink shrimp are now harvested off the coasts of California, Oregon, Washington, and British Columbia.

FISHING METHODS AND GEAR

A Gulf of Mexico-type flat trawl, 43 feet along the footrope^{1/} and of 1½-inch mesh was the principal gear used in the explorations (fig. 2). The trawl, similar to that described by Schaefers and Johnson (1957), was towed from a single warp using a 25-fathom bridle. Doors used with this net measured 2½ by 5 feet and weighed 160 pounds each. No "dandyline" gear was used as the net was attached directly to the back of the doors by 2-foot extension straps (fig. 3). The gear was set and hauled directly over the stern of the vessel. The cod end was hauled to the stern with a lazyline as the net was retrieved, and the catch was hoisted aboard.

A 72-foot Gulf of Mexico-type semiballoon trawl was occasionally used. That net has been described by Greenwood (1959). The net was rigged in a manner similar to standard West Coast otter trawls, with single warps to each door, but only 12-foot extensions were used between the net and the doors. Trawl doors used with the net measured 3½ by 8 feet and weighed 385 pounds each.

^{1/} All net sizes given in this report represent footrope lengths.

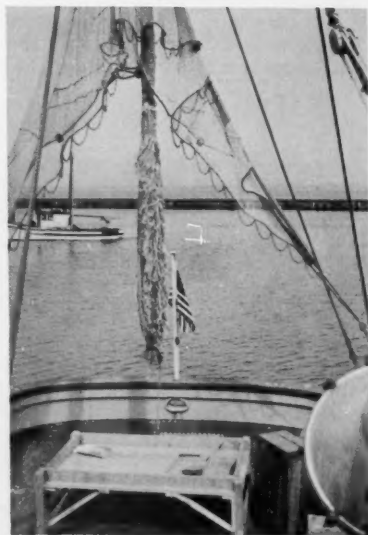


Fig. 2 - A 43-foot Gulf of Mexico-type shrimp trawl drying in the rigging of the M/V John N. Cobb. The sorting table is shown below the net.

Three fathoms of towing warp were used for each fathom of depth (a "scope" ratio of 3 to 1). Towing speed averaged about 2.8 knots, and drags were normally 30 minutes long.

Catches were spilled onto a sorting table on the stern of the vessel and fish, miscellaneous invertebrates, and trash were removed. The shrimp were then washed and weighed.

Random samples of shrimp were taken from the catches for study by biologists of the Washington Department of Fisheries or the Oregon Fish Commission or were collected for them by vessel personnel.



Fig. 3 - Port-side otter board showing method of net attachment. Note lazyline attached to upper door shackle.

In planning and conducting the explorations, consideration was given to bottom characteristics shown on the U. S. Coast and Geodetic Survey charts. Studies of previous investigations showed that trawling in areas between 40 and 90 fathoms on green mud or mixed green mud and sand bottom yielded best catches of ocean pink shrimp. Such areas were, therefore, intensively investigated. Exploratory drags were also made in waters deeper than 90 fathoms in attempts to determine the availability of other species of shrimp.

Information on the bottom type and bottom water temperature immediately above the bottom was obtained at the end of each drag. Oceanographic data collected during the cruises are available from the U. S. Bureau of Commercial Fisheries North Pacific Exploration and Gear Research field station at Seattle 2, Wash.

AREAS OF EXPLORATION

The cruises covered a region that extended approximately 250 miles north and south along the Washington and the Oregon coasts and to a maximum of 38 miles off-shore. The continental shelf in the region explored, averages about 20 miles in width and contains large portions exceeding 50 fathoms with terminations close to 100 fathoms (Shepard 1948). Sandy bottom predominates near shore, while mud, mud and sand, and occasionally gravel characterize the bottom at depths between 50 and 100 fathoms.

A broad bank, extending approximately 50 miles seaward, lies south and west of the Swiftsure Lightship at depths of 60 to 80 fathoms. Large boulders limit trawling in the area.

A deep trough breaking the continental shelf extends from Cape Flattery in a southwesterly direction (figs. 5, 6, and 7). Sections of the trough range from 150 to 200 fathoms in depth. From Cape Flattery south to the Umatilla Lightship, the continental shelf is about 10 miles in width, and from a depth of about 50 fathoms it slopes steeply into the trough.

From the Umatilla light to Destruction Island, the shelf broadens and the slope between 50 and 100 fathoms is gradual with more area available for trawling. The shelf narrows briefly near Point Grenville and then broadens again and is about 30 miles in width as far south as Willapa Bay. Between Cape Flattery and Columbia River, the offshore slope (deeper than 100 fathoms) is relatively steep and irregular.

Off the mouth of the Columbia River, the continental shelf is broken by a prominent submarine canyon that extends inshore to about 60 fathoms. The side slopes of the canyon are steep but can be trawled in many areas. Between the Columbia River and Cape Falcon the shelf broadens to about 30 miles, narrowing again south of the Cape. From Cape Falcon to Cape Foulweather, Oreg., the slope of the continental shelf becomes more gradual and a considerable area suitable for trawling exists between the 100- and the 300-fathom contours.

FISHING RESULTS

Ocean pink shrimp were the only species found in commercial quantities during the four cruises. Larger pandalid shrimps--sidestripe (*Pandalopsis dispar*), spot shrimp (*Pandalus platyceros*), and coonstripes (*Pandalus hypsinotus*)--were few in number. The brown shrimp (*Crago* sp.) was present in many catches but never in commercial quantities.



Fig. 4 - A large catch about to be spilled onto the sorting table on the deck of the John N. Cobb.

Ocean pink shrimp were caught in commercial quantities off the coasts of Northern Washington and Central and Northern Oregon. Best catches off the Oregon coast were made west of Tillamook Head. Fishing in that area yielded catches at rates up to 2,800 pounds heads-on shrimp an hour. Catches of commercial significance were also made west of Cape Lookout and Manhattan Beach. (Fig. 4.)

Off the Washington coast, good catches of ocean pink shrimp were caught between Destruction Island and LaPush. Somewhat smaller catches were taken northwest of Cape Flattery.

During the four exploratory cruises, 233 drags were made at depths ranging from 49 to 275 fathoms. For convenience, the region explored has been divided into three areas: Cape Beale, Vancouver Island, to Point Grenville, Wash.; Point Grenville to Cape Falcon, Oreg.; and Cape Falcon to Newport, Oreg. The position and number of each tow is shown in figures 5, 6, and 7. Drags have been arbitrarily numbered from north to south. The following discussion is generally confined to drags which yielded promising results.

CAPE BEALE TO POINT GRENVILLE (fig. 5): A total of 69 exploratory drags was made between Cape Beale, Vancouver Island, and Point Grenville, Wash. The bottom in that area is generally free of snags, and in most areas sampled, consists of green mud or green mud and sand.

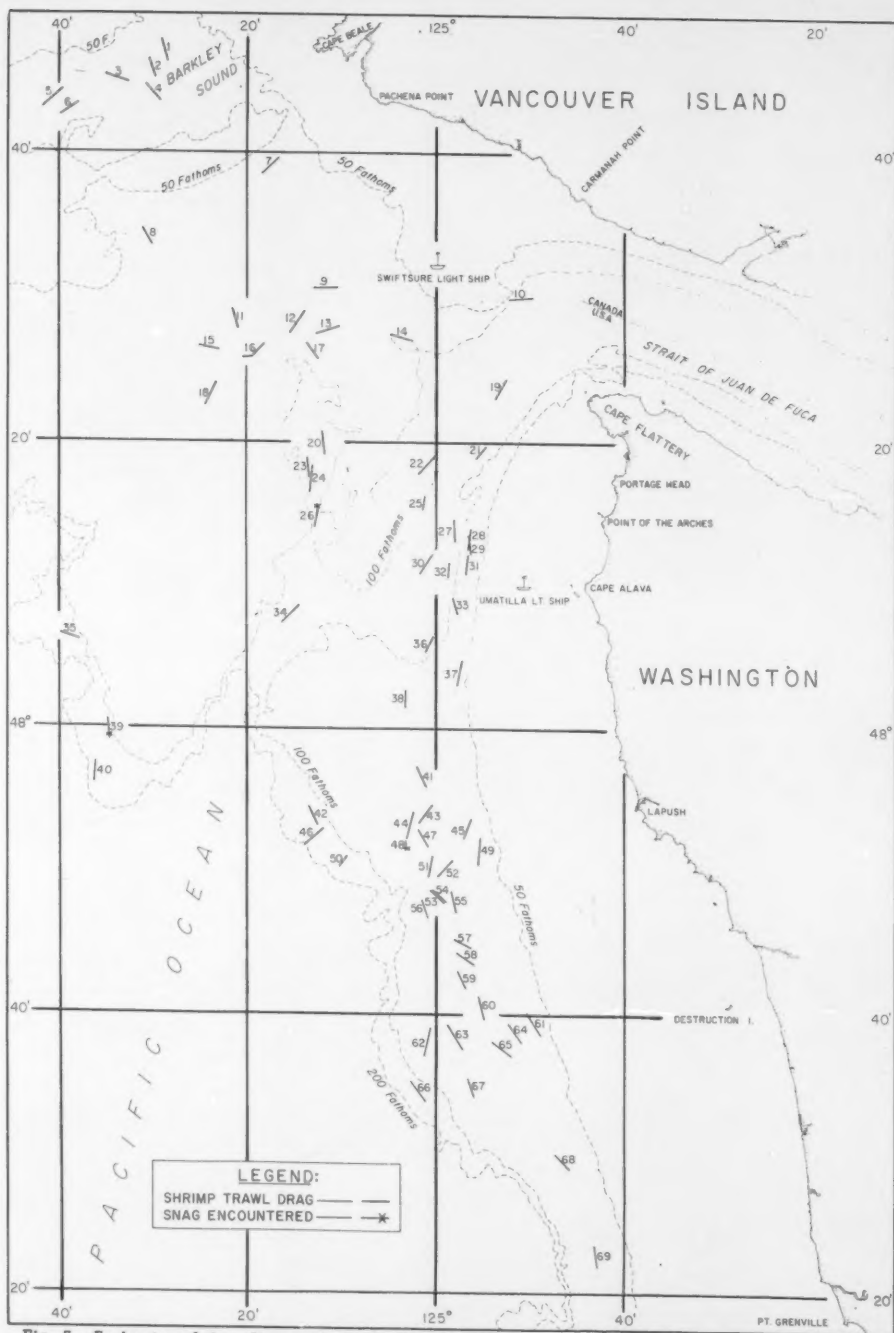


Fig. 5 - Exploratory shrimp drags made by the John N. Cobb between Cape Beale, Vancouver Island, and Point Grenville, Wash.--1958.

Best catches were made between LaPush and Point Grenville, Wash.^{2/} Of 29 drags made in that area during May 11 drags caught heads-on pink shrimp at rates ranging from 400 to 1,500 pounds an hour--averaging about 200 to the pound.^{3/} The shrimp in the area were most concentrated between 61 and 70 fathoms, and drags made in shallower or deeper water were not commercially productive.

Moderate catches of ocean pink shrimp were made during May about 20 to 30 miles off Cape Flattery. Six drags (numbers 8, 11, 12, 16, 17, and 23) made in that area, at depths ranging from 68 to 107 fathoms, resulted in heads-on shrimp at catch rates of 233 to 650 pounds an hour. Average shrimp counts ranged from 102 to 135 heads-on shrimp per pound. Other drags made in the same general area and depth range were less productive. The area west of Cape Flattery appeared to offer a potential for commercial use, although catches contained considerable amounts of fish.

One drag (number 2) made west of Cape Beale in 64 to 66 fathoms resulted in a catch of 200 pounds of ocean pink shrimp that averaged 107 count, but other drags in the area did not produce commercial quantities of shrimp. Thirty pounds of side-stripe shrimp (56 shrimp to the pound) were taken west of Cape Beale (drag 3), and represented the largest catch of that species made during the explorations.

A number of drags were made in the deep-water trough running southwest from Cape Flattery and on the offshore continental slope. No commercial concentrations of shrimp were found in those deep-water tows.

POINT GRENVILLE TO CAPE FALCON (fig. 6): A total of 81 exploratory drags was made between Point Grenville, Wash., and Cape Falcon, Oreg. Fishing activities were concentrated in the area between Columbia River and Cape Falcon, because most of the northern part of the area was investigated during 1956 (Schaefers and Johnson 1957). No snags were encountered during exploratory trawling at depths shallower than 100 fathoms, although the net was fouled several times when trawling in deeper water.

Best shrimp catches during the explorations were made between the Columbia River and Cape Falcon, Oreg., where a total of 74 exploratory drags was made. The largest catch (drag 121) in the area resulted in an hourly rate of 2,804 pounds of heads-on shrimp that averaged 100 count. A 72-foot semiballoon trawl was used for that drag which was made west of Tillamook Head in 82 to 83 fathoms. Seventeen other drags made during March and April at depths from 70 to 91 fathoms, between Columbia River and Cape Falcon, yielded heads-on shrimp at rates from 600 to 1,350 pounds an hour. Those shrimp ranged in size from 88 to 126 a pound. Six of the latter drags (numbers 99, 103, 119, 123, 126, and 149) were made with the 72-foot semiballoon trawl. The majority of the larger catches in the area were obtained in a relatively narrow depth range, i.e., between 82 and 86 fathoms.

Catches between Point Grenville and the Columbia River were generally poor, and deep-water tows through that area and south to Cape Falcon yielded only trace amounts of shrimp.

CAPE FALCON TO NEWPORT (fig. 7): A total of 83 exploratory drags was made between Cape Falcon and Newport, Oreg. The bottom was clear in areas fished, and only 2 snags were encountered.

Good catches of pink shrimp were made in the general area off Cape Lookout during June at depths between 90 and 114 fathoms. Seven drags (numbers 170, 171, 173, 174, 177, 185, and 186) in that area produced heads-on shrimp ranging from 81 to 138 per pound, at rates from 380 to 850 pounds an hour. Four other drags in the same area and depth range were less productive.

^{2/}Subsequent to exploratory work conducted in 1958 the commercial fishery expanded to include this area, as well as the grounds off northern Oregon.

^{3/}Counts given in this report are the number of whole shrimp (heads-on) per pound.

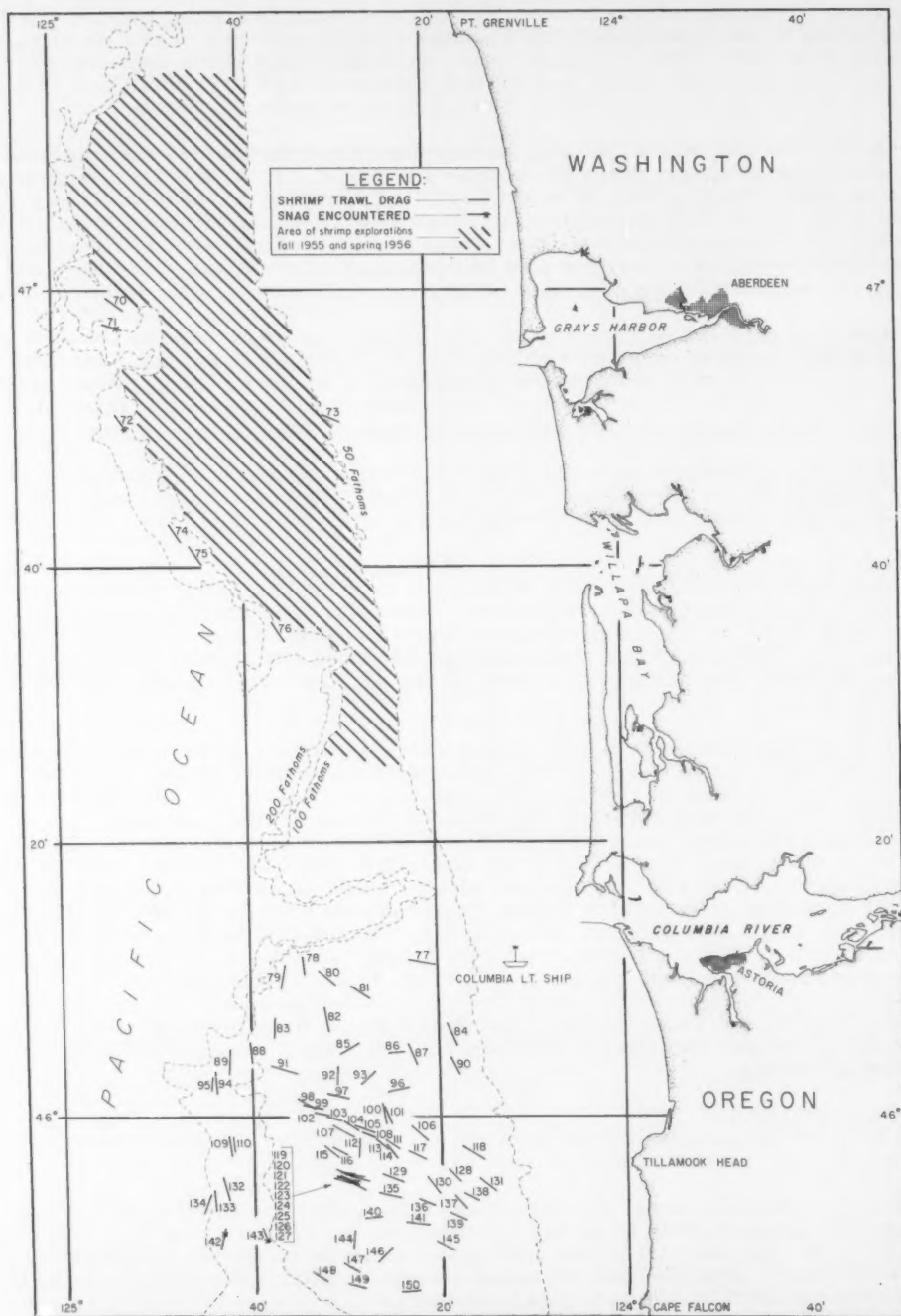


Fig. 6 - Exploratory shrimp drags made by the John N. Cobb between Point Grenville, Wash., and Cape Falcon, Oreg. --1958.

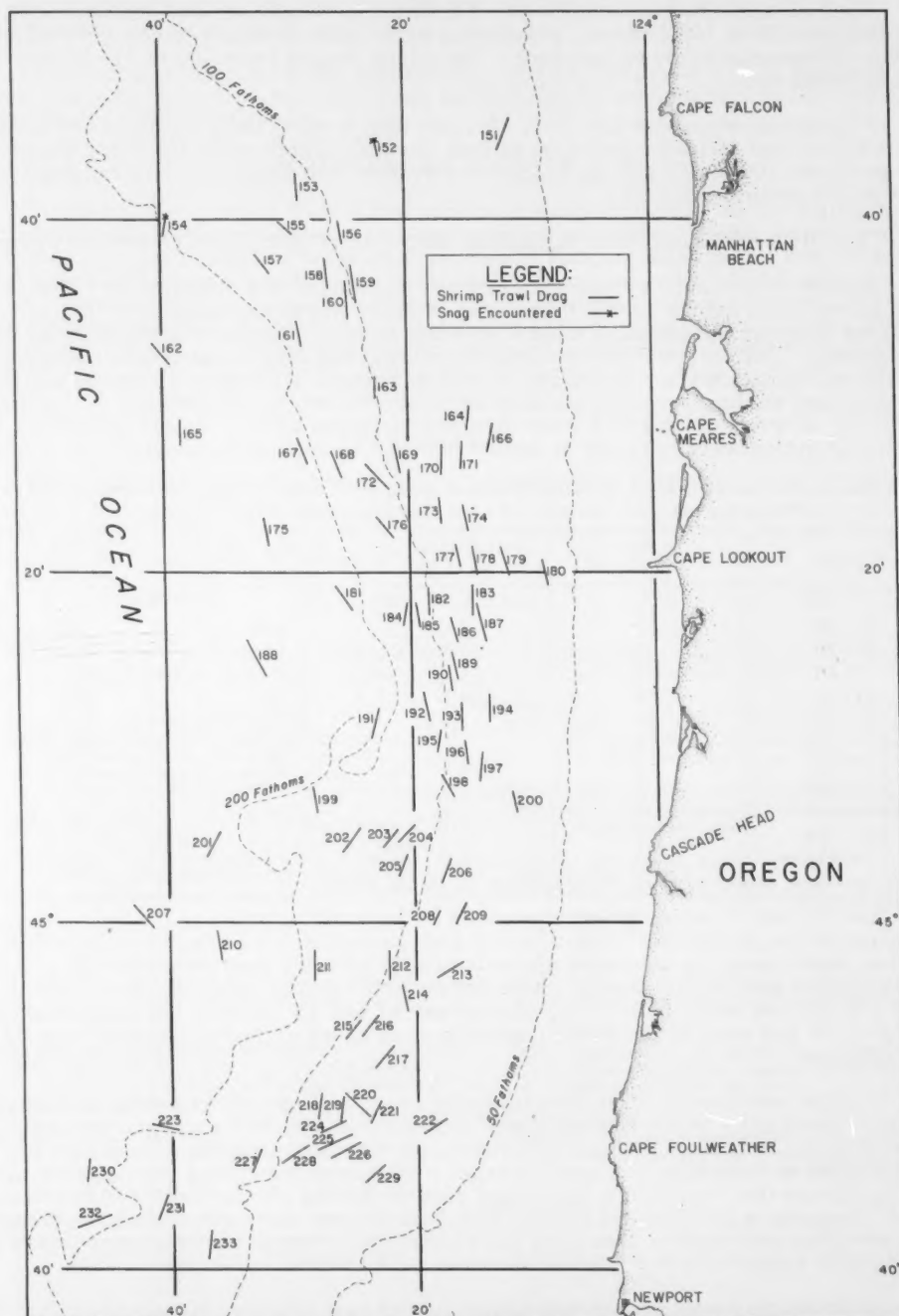


Fig. 7 - Exploratory shrimp cruise made by the John N. Cobb between Cape Falcon and Newport, Oreg.--1958.

West of Manhattan Beach, the three best drags (numbers 153, 158, and 159), at depths from 96 to 105 fathoms, resulted in ocean pink shrimp catches at rates from 440 to 600 pounds heads-on per hour. The count ranged from 109 to 175 shrimp per pound heads on.

Four drags (numbers 215, 224, 225, and 226) west of Cape Foulweather in 76 to 99 fathoms also yielded a fair sign of pink shrimp. Catch rates for those drags ranged from 200 to 450 pounds heads-on per hour with sample counts ranging from 129 to 170 shrimp per pound.

CATCHES AS RELATED TO DEPTH, BOTTOM TYPE, AND TEMPERATURE

Results of previous exploratory cruises (Schaefers and Johnson 1957, Pruter and Harry 1952, Squire 1956) off the west coast of North America show that concentrations of ocean pink shrimp most frequently occur at depths ranging from 40 to 90 fathoms. The larger catches of shrimp during the 1958 explorations were caught within that range, but several drags at depths down to 115 fathoms also yielded good catches, and shrimp were not found in abundance at depths of less than 60 fathoms (table 1). Highest catch rates were obtained at depths between 61 and 90 fathoms, and moderate yields were obtained at depths between 91 and 120 fathoms.

Table 1 - Rates at Which Shrimp Were Caught at Various Depth Intervals Off the Washington and Oregon Coasts During 1958 Explorations^{1/}

Depth	Drags Made	Total Hours Fished	Total Catch (heads on)	Catch rate/hour
Fathoms	No.		..... (Pounds)	
51-60	8	4.0	185	46
61-70	35	17.5	6,049	346
71-80	30	15.0	3,859	257
81-90	57	28.5	10,327	362
91-100	23	11.75	2,239	191
101-110	17	8.5	903	106
111-120	5	2.5	419	168
121-130	6	3.0	25	8
131-140	3	1.5	62	41
141-150	6	3.0	7	2
151-275	30	15.0	1	0

^{1/} Does not include 13 drags during which gear failure or damage was noted.

Data in table 1 summarize information from various times of the year and over a considerable geographic range. Ocean pink shrimp may be concentrated within a narrow depth range on one bank, while on nearby grounds they may be found at different depths and over a greater depth range: best catches between Destruction Island and LaPush were made at depths between 61 and 70 fathoms, and good catches to the north and west of Swiftsure Lightship were taken at depths ranging from 68 to 107 fathoms.

Vertical movements of shrimp probably occur seasonally, resulting in changes in their availability to the fishing fleet. Such movements, however, are not demonstrated by the data from these explorations. Evidence of vertical movements of pink shrimp in response to diurnal changes has been noted during comparative night and day drags that resulted in "excellent catches during the day and poor catches at night" (Schaefers and Johnson 1957). That pink shrimp move off the bottom at night was also demonstrated by nighttime midwater trawl catches off Vancouver Island by the John N. Cobb (Fish and Wildlife Service, U. S., 1956).

Green or gray mud bottom was associated in past studies with areas inhabited by pink shrimp, and in all drags where 50 pounds or more of shrimp were caught

during the 1958 cruises, the bottom consisted of green mud or green mud mixed with sand or clay.

Bottom temperatures varied between 42.1 and 46.7 degrees F. No apparent relation was noted between catches of pink shrimp and differences in bottom water temperature within that range.

INCIDENTAL CATCHES OF FISH

Catches of fish ranged from a few pounds to 4,000 pounds.^{4/} Smelt (*Osmeridae*), eelpouts (*Zoarcidae*), small rex sole (*Glyptocephalus zachirus*), and slender sole (*Lyopsetta exilis*) dominated incidental catches of fish in numbers and were taken in most drags. Catches of marketable food fish were usually small, although some drags west of Swiftsure Lightship yielded several hundred pounds of mixed Dover sole (*Microstomus pacificus*), Pacific ocean perch (*Sebastes alutus*), and sablefish (*Anoplopoma fimbria*). Other species common in the catches included turbot (*Atheresthes stomias*), dogfish (*Squalus acanthias*), ratfish (*Hydrolagus coliei*), hake (*Merluccius productus*), and skates (*Raja* sp.).

APPENDIX

A detailed fishing log, showing geographic position, depth, date, catch, and related data for each drag, is available as an appendix to the reprint of this article. Write for Separate 574, which shows Table 2--Fishing Log--Shrimp Trawl Drags Made off the Washington and Oregon Coasts--M/V John N. Cobb, 1958.

LITERATURE CITED

- BONNOT, PAUL
1932. The California Shrimp Industry. California Division of Fish and Game, Fisheries Bulletin No. 38.
- BUTLER, T. H., and DUBOKOVIC, G. V.
1955a. Shrimp and Prawn Prospecting on the British Columbia Coast, June to December 1954. Fisheries Research Board of Canada, Pacific Biological Station, Circular No. 35 (February).
1955b. Shrimp Prospecting in the Offshore Region of the British Columbia Coast, June to August 1955. Fisheries Research Board of Canada, Pacific Biological Station Circular No. 39 (November).
- BUTLER, T. H., and LEGARE, H. E. J.
1954. Shrimp Prospecting in Regions of the British Columbia Coast, November 1953 to March 1954. Fisheries Research Board of Canada, Pacific Biological Station, Circular No. 31 (April).
- CALIFORNIA DIVISION OF FISH AND GAME
1949. The Commercial Fish Catch of California for the Year 1947 With an Historical Review 1916-1947. Fisheries Bulletin No. 74.
- FISH AND WILDLIFE SERVICE, U. S.
1956. Promising Results With Midwater Trawls by John N. Cobb (Cruise 27). *Commercial Fisheries Review*, vol. 18, no. 8 (August), p. 39.
- GREENWOOD, MELVIN R.
1959. Shrimp Explorations in Central Alaskan Waters by M/V John N. Cobb, July-August 1958. *Commercial Fisheries Review*, vol. 21, no. 7 (July), (Separate No. 553.)
- PRUTER, ALONZO T., and HARRY, GEORGE Y., JR.
1952. Results of Preliminary Shrimp Explorations off the Oregon Coast. Fish Commission of Oregon, Research Briefs, vol. 4, no. 1 (December).
- ROBISON, ROBERT T., WARD, DALE, and PALMER, ARTHUR
1958. 1957 Fisheries Statistical Report, Washington Department of Fisheries.
- SCHAEFERS, EDWARD A., and JOHNSON, HAROLD C.
1957. Shrimp Explorations off the Washington Coast, Fall 1955 and Spring 1956. *Commercial Fisheries Review*, vol. 19, no. 1 (January), (Separate No. 465).
- SHEPARD, FRANCIS P.
1948. Submarine Geology, Harper and Brothers, Publishers, New York, pp. 117 and 119.
- SMITH, RICHARD T.
1937. Observations on the Shrimp Fishery in Puget Sound. Washington Department of Fisheries, Biological Report No. 36 D.
- SQUIRE, JAMES L., Jr.
1956. Development of the Pacific Coast Ocean Shrimp Fishery. *Commercial Fisheries Review*, vol. 18, no. 9 (September), (Separate No. 447.)
- STERN, JOSEPH A.
1958. The New Shrimp Industry of Washington. Proceedings of the Gulf and Caribbean Fisheries Institute, Tenth Annual Session (November), pp. 37-42.

^{4/}A catch of 4,000 pounds of dogfish was taken during drag 10. Other drags took lesser amounts of incidental fish.

FISH FLOUR FOR HUMAN CONSUMPTION

By June H. Olden*

ABSTRACT

A review of the scientific literature on fish flour; references to the original literature are appended.

INTRODUCTION

Economically underdeveloped countries have long needed an inexpensive source of animal protein for human consumption as a help in preventing malnutrition. The use of fish offers a possible way of alleviating this deficiency. A difficulty arises, however, in that in many of the countries where inexpensive protein is needed most, the means of preservation are least available. One approach to the solution of this problem is to dehydrate the fish in order to prevent spoilage. In the category of dehydrated fish is edible fish meal, or fish flour^{1/}. Research programs therefore have been undertaken in several countries to produce a tasteless, odorless, white fish flour for use as a source of the required protein.

In this report, the following topics are discussed: problems encountered in the use of fish flour, nutritional importance, acceptance tests, and processes of manufacture.

PROBLEMS ENCOUNTERED

Some of the problems in using fish flour as a protein supplement are preservation, consumer reaction, and cost. The first two problems directly contribute to cost, since the process that makes the flour resistant to deterioration and renders it tasteless and odorless--and thus acceptable to the consumer--increases the cost.

PRESERVATION: The keeping quality of fish flour depends primarily on the low oil content of the final product to prevent it from becoming rancid. The producer, in order to supply the needs of people in various countries, must furnish a flour that can resist deterioration when stored at high temperatures and under adverse conditions. One of his essential problems, then, is to make a product that is low in oil.

CONSUMER REACTION: In countries where people object to a strong fish flavor, the flour must be refined, deodorized, or manufactured in such manner that the final product is substantially flavorless (Food and Agriculture Organization of the United Nations 1954).

The product should be of such quality that it can be incorporated in quickbreads, cakes, cookies, cereals, pastries, and baby foods without lowering the appeal of these foods to the consumer.

COST: One of the difficult problems to overcome is that of cost. A factor in cost that must be kept in mind is the loss in weight of the product due to removal of moisture and oil from the raw material. Owing to this removal, less than one-fifth as much fish flour as the weight of the raw material is produced. This means in general that the cost of fish flour is more than five times the cost of the raw material, since processing costs must be included as well.

The high cost of producing fish flour for human food, in contrast to the relatively low cost of producing fish meal for animal feed, results from the palatality, sanitation, and aesthetic requirements of the consumer. Where fish flour must

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^{1/} Authors often use the terms fish meal and fish flour synonymously.

meet the strictest aesthetic requirements, costs will necessarily be high, since only the more costly portions of the fish can be used.

Van Veen (1959)^{2/} reports: "A good defatted and deodorized fish flour, on a protein basis, should not cost to the consumer in underdeveloped countries much more than he would pay for dry skim milk in the same area. As for the U. S. A. we have been assured by an American firm that a partially deodorized fish flour costs about 36 to 38 cents a kilogram^{3/}. We think that a price of 24 to 40 cents per kilogram is realistic."

NUTRITIONAL IMPORTANCE

In any process of manufacture, the nutritional value of a food product may be reduced. Thus, there may be loss of vitamins and minerals, and the protein may be made less digestible.

Irving, Smuts, and Sohn (1952) compared white fish flour (86.2 percent protein) with bread as to true digestibility and obtained the following data: white fish protein 95.6, bread 93.8, and white fish protein and bread 92.1.

Analyses of bread made from enriched and unenriched brown flour and a comparison with daily requirement are shown in table 1 (Fishing Industry Research Institute 1958).

Biological value of pilchard fish flour and pilchard meal is shown in table 2 (Willmer 1955).

Table 1 - Analyses of Bread Made from Enriched and Unenriched Brown Flour and Comparison with Daily Requirement						
Material and Requirement	Protein G./100 g.	Calcium	Phosphorus	Thiamine	Niacin	Riboflavin
Brown bread	9.0	50	160	0.3	2.0	0.13
Fish flour	80	7,000	4,500	0.13	5	0.22
2%-enriched brown bread	10.4	186	245	0.296	2.06	0.132
Daily requirement	70	800	900	1.5	15	1.8

Note: From Memorandum No. 89, Fishing Industry Research Institute, Cape Town, South Africa, 1958.

In order

that a standardized stable fish meal may be produced that is equal in chemical and biological value to the fish from which it is derived, Levin (1959) suggests: (1) the product must be made from the whole fish with no division of products into fish meal and fish solubles, (2) the fish must be defatted and dried at temperatures that

Table 2 - Biological Value of Pilchard Fish Flour and Pilchard Meal			
Material	Net Protein Utilization	True Digestibility	Biological Value
Pilchard meal, factory produced.	61.6	86.8	71.0
Pilchard fish flour, prepared in laboratory	62.6	82.6	75.8

Note: From Eighth Annual Report of the Fishing Industry Research Institute, Cape Town, South Africa, 1955.

will not damage the product, and (3) the fish meal must be standardized on the basis of biological value. Both an animal as-

say that is accepted by

nutritionists as a measurement of protein quality and a biological measurement of the identified growth factors should be obtained.

The bulk or fiber content of the diet often may be a determining factor in the digestibility of protein incorporated in that diet (Nutrition Reviews 1955).

Sure (1957a) reports that fish flour was used in rat-feeding studies to determine the influence of this product on growth and protein efficiency. Small amounts of defatted fish flour were added to milled wheat flour, white corn meal, and polished rice. Gains in body weight and protein efficiency obtained were superior to those obtained in the past with dried nonfat milk solids, dried buttermilk, defatted soybean flour, brewers' yeast, cultured food yeasts, and peanut meal.

He also reports (1957b) that rats used in feeding tests in which small amounts of defatted fish flour were added to whole yellow corn, whole wheat, whole and

^{2/} Personal communication from A. G. van Veen, Chief, Food Processing and Preparation Branch, Nutrition Division, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, June 18, 1959.

^{3/} 2.2 pounds = 1 kilogram.

milled rye, grain sorghum, and millet showed definite increases in body weight. The greatest responses were secured with grain sorghum, millet, and whole yellow corn.

ACCEPTANCE TESTS

Experiments on consumer acceptance of fish flour have been conducted in a number of countries, including Chili, Thailand, and Mexico.

CHILI: Each day for 6 weeks, 140 school children in Chili received, as part of their school lunch, a 90-gram bread roll made from wheat flour containing 10-percent fish flour. Taste, smell, form, and consistency of the bread were normal, and the bread was only slightly darker than is that made from ordinary flour. There were no rejections or complaints by the children, and no digestion trouble occurred (Food and Agriculture Organization of the United Nations 1954).

THAILAND: An experiment, the results of which have not been published as yet, was carried out in the village of Nongkorn, Ubol Province, Thailand, to test the acceptability of fish flour by the people of the village. About 600 persons were given a daily ration of 15 grams of fish flour to supplement their scant intake of protein. This flour was made from "platu" and "slipmouth" fish. About 5 tons of flour can be produced from about 28 tons of fish per day. Smaller fish, which previously had little or no market, can be used for the fish flour.

If this experiment proves successful, the flour will be made available to all villages of the province (FAO Bulletin No. 2).

MEXICO: Levin (1959), citing the work of Frederico Gomez ("Studies on the Use of Deodorized Fish Flour in Malnutrition," Boletin Medico del Hospital Infantil, September 1958), reports that at a hospital in Mexico, the value of fish flour has been studied for two years, using methods of measurement such as nitrogen balance studies on children--comparing a corn-bean diet plus 10-percent fish flour with the same diet plus the nitrogen equivalent in the nonessential amino acid glycine. The results indicate that fish flour is of value as a dietary supplement.

PROCESSING

Over the years, many methods for making fish flour have been tried. These methods are basically quite similar to those for preparing fish meal (in fact, as was indicated earlier, some authors use the terms fish meal and fish flour synonymously), but greater attention is given to the sanitary and aesthetic aspects.

As also was indicated earlier, one of the major problems that must be resolved is the oxidation of oil in the fish flour. Since the ordinary methods of producing fish meal leave considerable oil in the material, the product generally is not suitable for human use unless the starting material is very low in oil content.

For this reason, attention now has turned largely to a process of manufacture based primarily on solvent extraction. This process, of which there are a number of variations, is effective in removing oil.

TENTATIVE SPECIFICATIONS FOR SOLVENT-EXTRACTED FISH FLOUR: Food and Agriculture Organization and UNICEF, agencies of the United Nations, developed the following "Tentative Specifications for Solvent Extracted Fish Flour Defatted and Deodorized." These Specifications, dated June 12, 1957, remain in effect, although they are still tentative:

"1. Starting material shall be edible fish of a known species and in a condition fit for human consumption at the start of the process. The material to be processed

shall be whole fish or whole degutted fish, or degutted fish with heads and tails removed.

"2. Handling of the fish from catch to end of processing shall be done with sanitary precautions ordinarily applied in producing human food. The fish may be dried either during the process of solvent extraction or by a preliminary stage of air drying. In either case, temperatures shall be kept sufficiently low to avoid protein damage. In general, temperatures in excess of 212° F. will result in definite damage. Lower temperatures may cause some damage under certain circumstances.

"3. Finished flour shall meet the following specifications:

"Protein (Nx6.25): content 70 percent minimum, digestibility 90 percent minimum, biological value 70 percent minimum.

"Amino Acids: Minimums of lysine 9.5 percent, tryptophan 0.9 percent, methionine 3.0 percent, cystine 1.0 percent (all as percent of protein).

"Moisture: maximum of 8 percent.

"Fat: maximum of 0.4 percent.

"Ash: maximum of 18 percent.

"Particle size: 100 percent of the flour shall pass a 100-mesh screen.

"Color: not darker than a light gray or tan; ordinary bread baked with 1 part fish flour and 11 parts of ordinary white wheat flour will not show appreciable darkening.

"Odor and Taste: the flour shall have no more than a faint fish odor and taste; and when baked in bread as described above shall have no detectable fish taste or odor.

"Storage stability: after 6 months storage at temperatures prevailing in the area of intended use but not exceeding 100° F., and when packed in closed fiber or metal containers or in polyethylene bags, the flour shall show no spoilage as judged by rancidity, mold growth, deterioration in biological value or 'flavor reversion' as judged by the criteria listed under odor and taste.

"Bacteriology: the flour shall be free of B. coli, Salmonella, and pathogenic anaerobes. The total bacterial plate count shall be not more than 2,000 per gram.

"Safety: no additives, preservatives, or solvent residues are permitted. Safety tests in at least one species of animal shall be done according to requirements of the appropriate official agency of the country where the flour is to be used. (Note: FAO and WHO advisory groups have recommended 6-months studies in rats using diets in which the fish flour is the sole source of protein, and the test should include one reproductive cycle. If there is any reason to suspect safety hazards, more elaborate tests and additional species of animals may be required. These recommendations pertain principally to products intended as supplementary foods for infants and children.)

"4. Chemical methods shall be those of the American Official Agricultural Chemists or equivalent 'official' generally-accepted methods. Amino acids may be determined microbiologically using generally accepted methods such as those described in Barton-Wright, E. C. "The Microbiological Assay of the Vitamin B Complex and Amino Acids," Pitman Publishing Corp., New York (1952), or chromatographically by the Moore and Stein procedure. Bacteriological methods shall be

official methods of the American Bacteriological Association, the American Public Health Association, or equivalent accepted methods. Biological value may be determined by the Miller-Bender or the Mitchell methods."

PRODUCTION: Some of the countries producing fish flour are South Africa, Canada, Great Britain, France, and the United States. Closely allied products are manufactured in India, Germany, and Russia. The process varies somewhat from country to country. References listed in the appended bibliography should be consulted for details on actual manufacture.

SOUTH AFRICA: Scientists in South Africa have reported that they have developed a process for making tasteless and odorless fish flour, which now is being used to enrich brown bread (Indo-Pacific Fisheries Council, FAO 1957). The flour has a moisture content that varies between 2 and 3 percent. It is light brown in color and contains no additives. The Fishing Industry Research Institute (1958) reports that the product is stable because of its low content of oil.

This fish flour has been incorporated to the extent of 5 percent in bread, biscuits, and rusks made of wheat flour (Fishing Industry Research Institute, S. Africa 1958). When the present plan is in full operation, about 5,000 tons of fish flour will be used each year (Indo-Pacific Fisheries Council, FAO 1957).

CANADA: Guttman and Vandenheuvel (1947) report that the fish flour manufactured at the Halifax Technological Station is almost white, odorless, and tasteless and contains 2 to 3 percent moisture, 2 to 5 percent ash (mostly calcium phosphate), negligible amounts of lipids, and 94 to 98 percent protein on a dry, ash-free basis.

GREAT BRITAIN: British Patent 727,072 provides a method of powdering fish that is reported in Food Manufacture (1955) to be economical and to result in a product that is tasteless and odorless.

FRANCE: In France, the preparation of fish meal for human food consists primarily in eliminating oil from the fresh fish. It is reported in Food Manufacture (1956) that the fish flour produced by this method is tasteless and odorless.

UNITED STATES: A plant in New Bedford, Mass., which uses an azeotropic solvent method, is apparently the only company in the United States producing fish flour at the present time. Whole fish--any species of any oil content--are processed into a fish flour reported to contain 70 to 80 percent protein and less than 1 percent oil. This company reports that their product can be processed to reduce its odor and flavor or to retain its odor and flavor, depending on the taste of the consumer, and it has good keeping qualities. The determining factors in producing the fish flour at a profit are cost of fish, cost of fuel, and cost of labor (Viobin Corporation 1956).

A fish-processing company with branches in Eastport and Rockland, Me., recently announced plans to produce fish flour on a large scale. A spokesman for the firm reported that the flour will be suitable for use in such foods as bread and crackers (The Fish Boat 1959).

Anyone contemplating the manufacture of fish flour in the United States should first contact the U. S. Food and Drug Administration to make certain that his product can meet food requirements.

The Federal Food, Drug, and Cosmetic Act defines a food as adulterated if it consists in whole or in part of any filthy, putrid, or decomposed substance or if it is otherwise unfit for food. It is the view both of the Food and Drug Administration and of the consumer that the viscera of the larger fish are filthy and otherwise aesthetically objectionable. Similarly, the head, scales, and tail of large fish are

considered unfit for food. The Food and Drug Administration has not objected to the presence of tails and viscera in small herring canned as sardines as long as the feed content of the viscera is eliminated. Another requirement of the Act is that food shall not be prepared, packed, or held under insanitary conditions whereby it may become contaminated with filth or whereby it may be rendered injurious to health.

In view of the above considerations, the use of whole fish or fish containing viscera with feed in the intestines, even though heads and tails are removed, would be objectionable in the manufacture of fish flour or fish meal for human consumption. The Food and Drug Administration would not take exception to the use, for this product, of small herring that were free of feed and subject to all the conditions that control the use of herring in the canning of sardines.

INDIA: Mohanty and Roy (1955) used the meat of sharks and rays to prepare a hydrolyzed fish-protein powder--a cream-colored, flourlike powder containing 85 percent protein. They report that hydrolyzed fish-protein powder is soluble in water, that it keeps well, and that it is useful as a food for hospitalized patients and those suffering from malnutrition or duodenal and ventricular ulcers.

GERMANY: Shenstone (1953) describes a process for making Wiking Eiweiss, a soluble albumen made from fish that can be used as a substitute for egg white. Good-quality fillets of white fish are required for the preparation of this product. He reports that the final product is a slightly gray, odorless and tasteless, easily digestible powder. It may be used in aerated bakery goods, sugar confectionery, ice cream, mayonnaise, custard powder, and pharmaceuticals.

RUSSIA: Schimkat (1955) describes a method of producing dry protein from inexpensive varieties of small fish in the U. S. S. R. He states that the protein is a water-soluble, cream-colored powder with very little fishy flavor and that it contains 70 to 80 percent protein, up to 10 percent minerals, 0.5 percent oil, and up to 10 percent moisture.

SUMMARY

1. Some of the problems encountered in the use of fish flour are preservation, consumer acceptance, and cost.
2. The nutritional aspects of fish flour are currently under study.
3. Fish flour is reported to meet consumer acceptance.
4. The basic process used in the manufacture of fish flour is solvent extraction.
5. A stable, tasteless, odorless, nearly white, edible fish flour is reported to have been produced.

BIBLIOGRAPHY

- ALLISON, J. B., and ASSOCIATES
1957. Notes on the Fish Meal and Fish Flour. Nutrition Division, FAO, United Nations, March.
1957. The Determination of the Nutritive Value and Safety of Fish Flour. WHO/FAO/UNICEF, United Nations, October.
- ANNALS OF THE NEW YORK ACADEMY OF SCIENCES
1958. Protein nutrition. *Annals of the New York Academy of Sciences*, vol. 69, January 10.
- BENDER, A. E. and HAZELDEN, SHEILA
1957. Biological Value of the Proteins of a Variety of Fish Meals. *British Journal of Nutrition*, vol. 11, no. 42.
- COMMERCIAL FISHERIES REVIEW
1957. Fish Flour--A Weapon Against Protein Malnutrition. *Commercial Fisheries Review*, Washington, D. C., vol. 19, no. 4 (April), p. 17.
- DABSCH, VICTOR M.
1957. Description of the Dabsch Process ("System Daco") for Processing Fish Flour for Human Consumption (released through FAO, January 3.)

DREOSTI, G. M., and VAN DER MERWE, R. P.

1956a. Factors Influencing Rate of Extraction. Tenth Annual Report of the Fishing Industry Research Institute, Cape Town, South Africa, April 1 - December 31, pp. 34-36.

1956b. "Hold-up" fat. Tenth Annual Report of the Fishing Industry Research Institute, Cape Town, South Africa, April 1 - December 31, pp. 36-37.

FISHING INDUSTRY RESEARCH INSTITUTE

1958. Fishing Industry Research Institute, Cape Town, South Africa, Memorandum No. 89.

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

1954. FAO's Work on the Utilization of Fish Meal in the Human Diet. FAO (Food and Agriculture Organization of the United Nations) Fisheries Bulletin, vol. 7, no. 3, (July - September), pp. 120-122.

1958. The use of Fish Flour as Human Food. Proceedings of Nutrition Society, vol. 17, no. 2.

FOOD MANUFACTURE

1955. Powdered Fish Production. Food Manufacture, vol. 30, no. 6 (June), p. 262 (British Patent 727,072).

1956. Fish Meal for Human Consumption. Food Manufacture, vol. 31, no. 4 (April), p. 159.

GUTTMANN, A., and VANDENHEUVEL, F. A.

1957. The Production of Edible Fish Protein (Fish Flour) from Cod and Haddock. Fisheries Research Board of Canada, Progress Reports of the Atlantic Coast Stations, No. 67, November, pp. 29-31.

INDO-PACIFIC FISHERIES COUNCIL, FAO

1957. South Africa Fish Flour Used for the Enrichment of Bread. Current Affairs Bulletin No. 19, July, p. 11.

IRVING, J. T., SMUTS, D. B., and SOHN, E. G.

1952. The Biological Value and True Digestibility of the Proteins Contained in White Fish Flour, the Standard Loaf and Standard Loaf Supplemented by White Fish. South African Medical Journal, vol. 26, pp. 206-207.

LEVIN, EZRA

1959. Fish Flour and Fish Meal by Azeotropic Solvent Processing. Food Technology, vol. 13, no. 2 (February), pp. 132-135.

MEINKE, W. W.

1959. Certain Enzymes Can Provide Human Food and General Feed Products from the Trash Fish of the Sea. Texas Engineering Experiment Station News, March.

MOHANTY, G. B., and ROY, A. B.

1955. Hydrolyzed Fish Protein from the Flesh of Waste Fish. Science, vol. 12, no. 3132 (January 7), pp. 41-42.

NUTRITION REVIEWS

1955. Protein Digestibility. Nutrition Reviews, vol. 13, no. 5 (May), pp. 156-157.

RAND, N. T., and ASSOCIATES

1958. Biological Evaluation of Fish Products for Protein Quality. Presented at the 47th Annual Meeting of the Poultry Science Assn., Ithaca, N. Y., August 6.

SCHIMKAT, U.

1955. Dry Protein From Cheap Small Fish. Deutsche Fischerei Zeitung, no. 2 (February), p. 50 (in German).

SHENSTONE, F. S.

1953. Egg White and Yolk Substitutes: Wilking Eiweiss. Food Preservation Quarterly, vol. 13, no. 3 (September), pp. 45-50.

SOMER, JOSEPH S.

- The study of the Value of Fish Flour on Humans.

SURE, BARNETT

1957a. The Addition of Small Amounts of Defatted Fish Flour to Milled Wheat Flour, Corn Meal and Rice--Influence on Growth and Protein Efficiency. The Journal of Nutrition, vol. 61, no. 4 (April 10), pp. 547-554.

1957b. The Addition of Small Amounts of Defatted Fish Flour to Whole Yellow Corn, Whole Wheat, Whole and Milled Rye, Grain Sorghum and Millet. I - Influence on Growth and Protein Efficiency. II - Nutritive Value of the Minerals in Fish Flour. The Journal of Nutrition, vol. 63, no. 3 (November 10), pp. 409-416.

THE FISH BOAT

1959. Maine Firm Plans Fish Flour Plant. The Fish Boat, vol. 4, no. 2 (February), p. 9.

UNITED NATIONS

1956. Notes on Fish Flour for Human Consumption. WHO/FAO/UNICEF, United Nations, March.

1958. The Use of Fish Flours as Human Food. Nutrition Division, FAO, United Nations, Proceedings of the Nutrition Society, vol. 17, no. 2.

Note on Protein Supplements for Children. Nutrition Division, FAO, United Nations.

VAN DER MERWE, R. P.

1956. Removing Fish Oil from Activated Carbon. Tenth Annual Report of the Fishing Industry Research Institute, Cape Town, South Africa, April 1 - December 31, pp. 37-38.

VIOBIN CORPORATION

1956. Fish Flour - A Review of Progress. Viobin Corporation, Monticello, Ill., July 1, 4 pp.

WILLMER, J. S.

1955. Evaluation of a Sample of Edible Fish Flour. Eighth Annual Report of the Fishing Industry Research Institute, Cape Town, South Africa, April 1, 1954 - March 31, 1955, p. 36.



SANITATION ABOARD FISHING TRAWLERS IMPROVED BY USING CHLORINATED SEA WATER

By Arvey H. Linda* and Joseph W. Slavin*

ABSTRACT

Chlorine, having proved effective as a sanitizing agent in fish-processing plants, was used for improving sanitation aboard fishing vessels. Sodium hypochlorite equipment was installed on a commercial fishing trawler for chlorinating the sea water used aboard this vessel. The equipment operated satisfactorily, and the chlorinated sea water was effective both in washing off slime and blood from eviscerated fish at sea and in washing and cleaning the hold of the vessel in port.

INTRODUCTION

Much has been done in recent years to improve sanitation in fish-processing plants. Today, the use of antibacterial compounds, disinfectants, detergents, and equipment made of stainless steel, plastic, or other impervious materials has resulted for the most part in a high degree of sanitation in fishery plants. Little has been done, however, to duplicate this aboard the fishing vessel. In most cases the closest approach to cleanliness consists of washing the hold and pen boards of the vessel with plain sea water, or in some cases with harbor water, without any antibacterial or other suitable cleaning compounds. The use of sea water for this purpose is far from satisfactory: slime and other organic material are not adequately removed, and by building up in the hold, they stimulate the growth of spoilage organisms. Under such conditions, the landing of high-quality fish is difficult, especially if the vessel is at sea for a long period of time.

In 1958 a project was started at the U. S. Bureau of Commercial Fisheries technological laboratory at East Boston, Mass., to develop a simple, inexpensive, and effective means for improving washing methods on fishing trawlers. Since chlorine has proved effective as a sanitizing agent in fish-processing plants (Fisheries Research Board of Canada 1947, Food Industries 1950, Hess 1950, Hurley 1949, and Kaylor 1949), it was used in this project to improve the sanitation on a commercial fishing trawler. Chlorinated sea water was used on the vessel instead of plain sea water for washing eviscerated groundfish at sea and the hold of the vessel in port after the fish were unloaded. The effectiveness of the chlorinating equipment was evaluated by industry and by members of the laboratory staff. The following is a report of this study. It contains information on the chlorinating equipment used and the experimental tests conducted. Conclusions and recommendations are also given concerning the use of chlorinating equipment on the vessel.

CHLORINATING EQUIPMENT

The equipment used consisted of a motor-driven sodium hypochlorite metering pump, a storage drum, and chlorine-test equipment.

DESCRIPTION OF EQUIPMENT: Metering Pump and Motor: The sodium hypochlorite metering pump and motor were mounted on a common base. This pump is of the diaphragm type and is belt driven by one-eighth horsepower, direct-current, electric motor. The length of the pump stroke may easily be adjusted in order to meter the desired amount of sodium hypochlorite into the line through which the saline wash-water passes. The flow of sea water through the line may vary from 20 to 60 gallons per minute.

Storage drum: A 55-gallon container was used for storing the sodium hypochlorite solution. This particular type of drum was selected because of its rugged construction, which is necessary to withstand the rough handling aboard the vessel.

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Chlorine-Test Equipment: A chlorine colorimeter was used to determine the concentration of free chlorine discharged from the salt-water line. This colorimeter consists essentially of a set of calibrated color standards representative of



Fig. 1 - Sea water chlorinating equipment aboard a fishing vessel.

the different concentrations of free chlorine in the chlorinated sea water. To determine the concentration of free chlorine, one adds a prescribed amount of stabilizer and reagent to a sample of the treated sea water. The resulting color is then matched with the color standards in order to determine the chlorine content of the sample in parts per million. A simpler and less expensive kit consisting of chemically-treated paper strips may also be used to determine the chlorine content.

Installation of Equipment: On most New England trawlers, the compartment

situated below the wheelhouse offers an ideal place for locating the chlorinating equipment. To conserve space, the metering pump and motor were mounted on one wall bracket and the two storage tanks on separate wall brackets below this pump (fig. 1). The plastic hypochlorite discharge line from the metering pump was connected into the side of the salt-water line, on the discharge side of the deck wash-water stop valve. In future permanent installations, a check valve should be installed between the wash-water stop valve and the hypochlorite connection on the wash-water line to prevent any of the caustic hypochlorite from attacking the sea-water pump or related piping. The desired equipment arrangement is shown in figure 2.

EXPERIMENTAL TESTS

PROCEDURE: The chlorinating equipment described previously was assembled at the laboratory and installed on a commercial fishing trawler (fig. 1). The hypochlorite metering pump was set to inject a 14-percent sodium hypochlorite solution into the wash-water line at a rate that resulted in a concentration of 50 to 60 parts per million (p.p.m.) of free chlorine in the salt water. This water was used for washing both the eviscerated fish at sea and the hold of the vessel at the end of each trip. Chlorinated sea water was used aboard this vessel for six regularly-scheduled trips. During that period information was obtained on the operation of the chlorinating equipment. Observations were also made concerning the sanitary condition of the fish hold and the quality of the fish landed.

RESULTS: Operation of Chlorinating Equipment: During the entire period of the test, the chlorinating equipment operated satisfactorily and required little attention. It was found that during continuous operation of the unit, 30 to 60 gallons of a 14-percent sodium hypochlorite solution was consumed during a 10-day trip. The consumption of sodium hypochlorite was reduced to about one-half this amount, however, by operating the metering pump intermittently instead of continuously. This intermittent operation was accomplished by installing a switch in the wheelhouse, which made it possible to use the unit only during the period that the fish were being washed at sea or that the hold of the vessel was being washed in port.

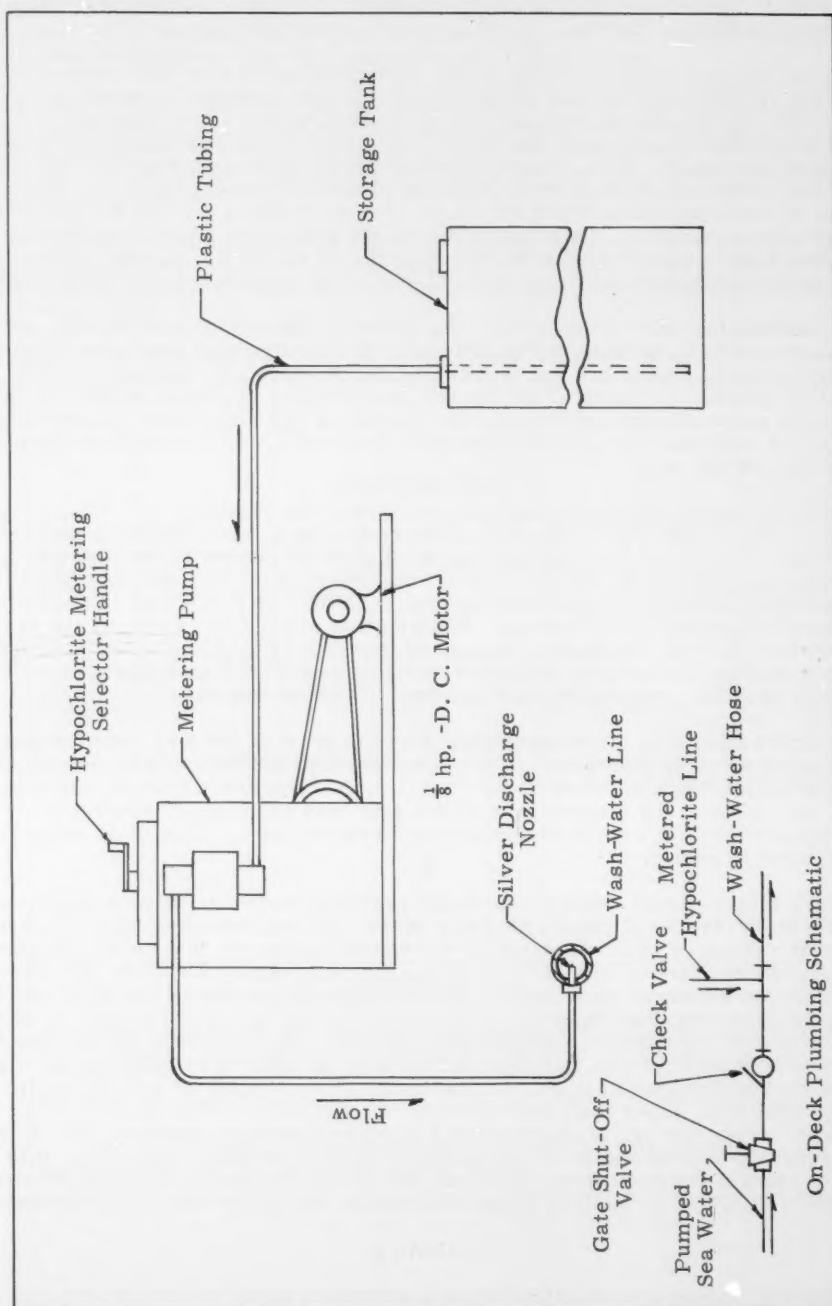


Fig. 2 - General layout of sodium hypochlorite metering installation.

In general, the chlorinating equipment was found to be quite satisfactory for use on a commercial fishing trawler.

Sanitation and Condition of the Fish: The chlorinated sea water was effective in washing the fish and the hold of the vessel. It was observed in washing the eviscerated fish that the chlorinated sea water rinsed the blood and slime of the fish more effectively than did plain sea water, resulting in the deposit of cleaner fish in the hold of the vessel. Also, the chlorine seemed to minimize the staining of the fillets that ordinarily results from bleeding caused by forking the fish. The concentrations of free chlorine of 50 to 60 p.p.m. used in washing the fish did not affect the odor or color of the fish. This substantiates the results of a previous study where it was found that concentrations of free chlorine up to 150 p.p.m. and 2,000 p.p.m. did not adversely affect the flavor and color of fish, respectively (Castell 1947).

In washing the hold of the vessel, the chlorine dispersed quite rapidly and did not affect personnel working in the fish hold. The chlorinated sea water also satisfactorily removed fish slime and blood from the storage pens and pen boards. The crew of the vessel commented that the pen boards were easier to wash with the chlorinated sea water than with plain sea water. It was also observed that after washing, the hold had a noticeable pleasant, clean odor, which remained during the greater part of the trip.

It is well known that even slight differences in the handling and icing of individual fish on the vessel may offset any increase in quality resulting from improved cleanliness. In view of this and because of slight differences in the methods of handling and icing the fish on the test vessel, objective tests were not conducted to determine if any extension in the keeping quality of the catch resulted from the use of chlorinated sea water on the vessel. Examination of the fish landed by the test vessel, however, showed that during the period that chlorinated sea water was used, the instances of bilgy and spoiled fish were reduced over previous trips when only sea water was used for washing the fish and the hold of the vessel.

An interesting side effect was noticed by the crew of the test vessel regarding the use of chlorinated sea water. They observed that the chlorinated sea water removed the slime from the deck of the vessel more effectively than did untreated sea water. As a result, the slipperiness of the deck was reduced considerably over that of previous trips when chlorinated sea water was not used. This is an important improvement in safety.

There may be some concern about the possible corrosive effects to the vessel resulting from the use of chlorinated sea water. No evidence has been found to indicate that corrosion is accelerated by the use of sea water containing chlorine in relatively low concentrations of 50 to 60 p.p.m. Apparently, the free chlorine is immediately neutralized upon contact with the organic matter in the hold and, therefore, little or no residual chlorine is left to attack the hull of the vessel or bilge pumps and other equipment. Chlorinated sea water has been used aboard two Boston fishing trawlers for one full year and on several other New England fishing vessels for shorter periods of time. No corrosion of the vessel or related equipment has been observed, other than that which normally occurs due to the presence of salt water. Also, the use of chlorinated sea water has been approved for use on vessels having pen boards and hold linings made of an iron-aluminum alloy. It is felt therefore, that if the installation plan outlined in this report is followed, no corrosion should occur as a result of using chlorinated sea water aboard the vessel.

SUMMARY

Chlorine, having proved effective as a sanitizing agent in fish-processing plants, was used for improving sanitation aboard the fishing vessel. Equipment was installed

on a commercial fishing trawler for chlorinating the sea water used in washing the eviscerated fish at sea and the hold of the vessel in port. The operation of this equipment was evaluated during six regular trips of this vessel.

The chlorinating equipment operated satisfactorily and required little attention. Also, the consumption of a 14-percent sodium hypochlorite solution used for chlorinating the sea water was very low, varying from 30 to 60 gallons for a 10-day trip. This amount can be further reduced by operating the metering pump intermittently instead of continuously.

The chlorinated sea water was effective in washing away the slime and blood from eviscerated fish at sea and in washing the hold of the vessel in port. The free chlorine had no effect on personnel working in the hold of the vessel or on the odor or color of the fish.

No objective tests were conducted to determine quality differences. Observations indicate, however, that there were fewer bilgy and spoiled fish landed by the vessel when chlorinated sea water was used than there were on previous trips of this vessel when plain sea water was used for washing the fish at sea and the fish hold in port.

LITERATURE CITED

- CASTELL, C. H.
1947. The Effect of Chlorine Solutions on the Color and Flavor and Preservation of Fish Muscle. Fisheries Research Board of Canada, Progress Reports of the Atlantic Coast Stations, no. 40, November, pp. 7-9.
- FISHERIES RESEARCH BOARD OF CANADA
1950. The Use of Chlorine Disinfectants in Fish Plants. Fisheries Research Board of Canada, Progress Reports of the Atlantic Coast Stations, no. 40, November, pp. 9-11.
- FOOD INDUSTRIES
1950. Break Point Sanitation Boosts Fish Quality. Food Industries, vol. 22, no. 3, March, pp. 178-180.
- HESS, ERNEST
1950. Bacterial Fish Spoilage and Its Control. Food Technology, vol. 4, no. 12 (December), pp. 477-480.
- HURLEY, STANLEY P.
1949. Sanitation Problems in the Fishing Industry. Food Technology, vol. 3, no. 12 (December), pp. 416-419.
- KAYLOR, JOHN
1949. Sanitation in the Fisheries. Modern Sanitation, vol. 1, no. 6 (October), pp. 32-36.



FISH FACT

About one-third of the protein consumed daily should come from animal sources such as fish and shellfish to complement incomplete proteins. A single average serving of fish and shellfish supplies enough complete proteins to satisfy the daily requirement.

The edible portion of fish consists of about 18 percent protein and contains all the essential amino acids.



OCEAN PERCH FILLETING MACHINE SUCCESSFULLY FILLETS YELLOW PERCH

A lot of Great Lakes yellow perch shipped from Vermilion, Ohio, was successfully filleted by an ocean perch filleting machine in Gloucester, Mass. The filleting machine had been received from Germany in mid-September 1959 and installed in a Gloucester, Mass., fillet plant. The machine was designed to fillet fish 7-14 inches in length. The yellow perch from Lake Erie have a minimum legal length of $8\frac{1}{2}$ inches, and a maximum commercial length of about 11 inches. The fish that were sent from Vermilion measured about $8\frac{1}{2}$ to 9 inches long.

The trial filleting was quite successful in that about 85-90 percent of the fillets were free from bones. The necessary trimming concerned cutting off a few rib bones, fins, and tag ends. The yield of fillets was about 51 percent by weight. This machine only cuts single fillets. It was estimated that the machine will cut about 1,000 pounds of fillets an hour with two persons feeding the machine and one person packaging. The capacity of the machine is limited by the speed of the feeding lines.

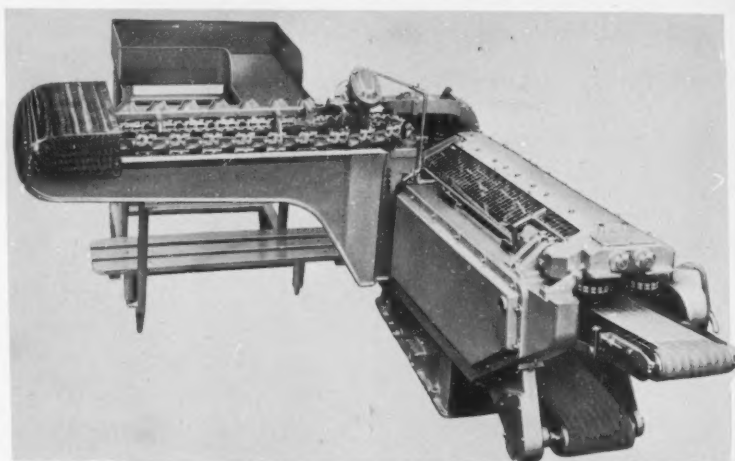


Fig. 1 - German ocean perch filleting machine used for tests on filleting of yellow perch.

The feeding line consists of an endless belt of nylon gutters into which the fish are placed head forward and back to the left. The head is cut off with a circular stainless steel knife while the fish are held in the before-mentioned gutter. The fish are then carried to the filleting part, and are dropped head forward, back up into a gutter. The fish are carried forward principally by means of two rubber belts, one on each side. The first operation of filleting is slitting the belly from head end to tail by means of a vertical circular knife. The entrails are pulled out by means of a stainless steel tooth-edged circular pulley. The fish are then carried forward to a flat inverted "V" which spreads the fish and pressure is applied to the belly walls from on top. Two circular knives cut the fillets while the fish is held on this distance piece. The frame drops below the knives to a belt which car-

The feeding line consists of an endless belt of nylon gutters into which the fish are placed head forward and back to the left. The head is cut off with a circular stainless steel knife while the fish are held in the before-mentioned gutter. The fish are then carried to the filleting part, and are dropped head forward, back up into a gutter. The fish are carried forward principally by means of two rubber belts, one on each side. The first operation of filleting is slitting the belly from head end to tail by means of a vertical circular knife. The entrails are pulled out by means of a stainless steel tooth-edged circular pulley. The fish are then carried forward to a flat inverted "V" which spreads the fish and pressure is applied to the belly walls from on top. Two circular knives cut the fillets while the fish is held on this distance piece. The frame drops below the knives to a belt which car-

ries heads and frames away. The fillets are carried by a second belt to the packing table. The machine is very well built and should be satisfactory for filleting Great Lakes yellow perch.

The price of the German filleting machine is \$27,500 landed, duty paid, ex-dock United States port of entry. All machines are installed by factory-trained technicians who also train the operating personnel with all details as to service and maintenance of the equipment. The cost for the services of such technician is \$25 a day, plus living expenses and travel expenses within the United States.

Note: For the name of the filleting machine and the name and address of the United States distributor, write to the Bureau of Commercial Fisheries, U. S. Department of the Interior, Washington 25, D. C.



LABORATORY WORK ON FROZEN SALMON STEAK STANDARD COMPLETED

The laboratory work on the frozen salmon steak standard is essentially complete. This standard will be in effect by early in 1960.

After the completion of the written standard, the U. S. Bureau of Commercial Fisheries carries out a grading survey to test the applicability of the standard. Based on the examination of 391 sample units (249 retail size units and 142 institutional-size units) taken from processors' warehouses the following findings were noted:

- (1) The average point score for the retail size units was 82 points, and for the institutional-size units 88 points. These data indicated that the quality of the institutional-size pack was significantly better than the retail-size pack.
- (2) The principal factor contributing to the Grade "B" and "Substandard" classification was flavor, primarily rancidity of the fatty portion.
- (3) The percentage glaze, free drip, and cook drip were not considered as factors of quality in grading of the frozen salmon steaks inasmuch as meaningful relationships could not be established.

An example of the close liaison maintained between the standards development and product inspection groups is demonstrated by the following:

The control of net package weights was found to be a serious problem in this survey. Our inspection personnel in following up on this problem during routine checking of net weight noted that the glaze water used in glazing salmon steaks was occasionally at some elevated temperature at the start of the steaking operation. As the steaking progressed, the temperature of the glaze water was continuously lowered until equilibrium temperature was attained. Adjustment for glaze pickup to meet net weight requirements if based on the initially warmer glaze water, resulted in underweight as the glaze water temperature dropped, due to the greater pickup of glaze at these lower temperatures. Thus, in order to control the percentage of glaze and thereby glaze allowance and net weight, the inspector found it necessary to routinely check glaze water temperature in order to protect the processor against excessive overweights or underweights.





TRENDS AND DEVELOPMENTS

Alaska

HEARING ON COMMERCIAL FISHERY REGULATIONS FOR 1960:

The first public hearing on commercial fishery regulations was held by the new State of Alaska when the Fish and Game Commission met at Juneau, November 18, 1959. Comments on proposals for management of the fisheries for 1960 were heard.

This will be the only hearing on 1960 regulations. It is expected that early promulgation of final regulations will follow the hearings so that they may take effect January 1, 1960, which is the date the State assumes management responsibility from the U. S. Bureau of Commercial Fisheries.

If the proposals for 1960 are adopted, these changes will occur: (1) any seiner over 50 feet cannot operate in the State's waters, and the rule extends the limit to include vessels operating west of False Pass; (2) trawling for king crab is banned, and this means fishing for king crabs will be limited to pot fishing; (3) drum seining (banned by the U. S. Fish and Wildlife Service in previous years) will be illegal in 1960; (4) preseason registration, similar to State of Washington regulations, will be required by April 15 and transfer of gear will be allowed only by the approval of the Commissioner.



American Samoa

TUNA LANDINGS, JANUARY-OCTOBER 1959:

During October 1959 tuna landings by Japanese and South Korean vessels fishing for the tuna cannery in American Samoa amounted to about 2.3 million

pounds. This amount was 27.4 percent or 885,000 pounds under the landings for

Species	October		Jan.-Oct.	
	1959	1958	1959	1958
	(1,000 Lbs.)			
Albacore . . .	2,075	2,637	17,359	18,087
Yellowfin . . .	187	500	3,618	4,685
Big-eyed . . .	78	91	826	965
Skipjack . . .	3	-	7	-
Total . . .	2,343	3,228	21,810	23,737

Note: Most of these tuna were landed by Japanese vessels; a small amount by South Korean vessels.

October 1958. The ten-months 1959 tuna landings of 21.8 million pounds were down 8.1 percent from the 23.7 million pounds landed in the same period of 1958.



California

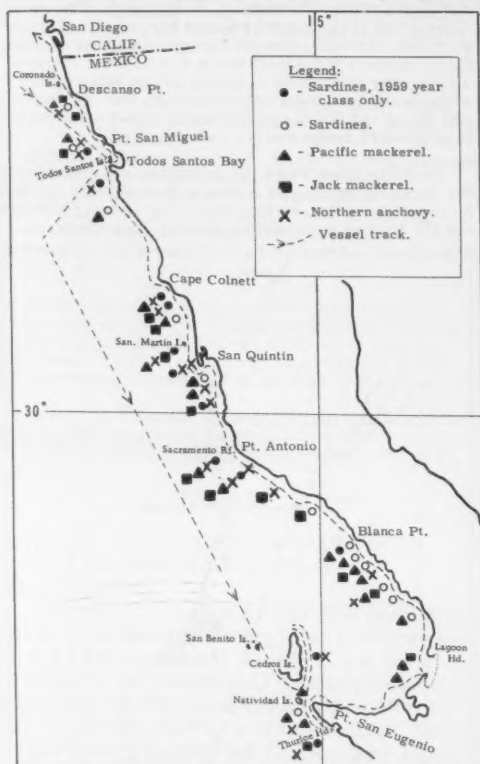
PELAGIC FISH POPULATION SURVEY OFF COAST OF SOUTHERN AND CENTRAL CALIFORNIA CONTINUED:

M/V "Alaska" Cruise 59A7-Pelagic Fish: The coastal waters off Baja California from Turtle Bay northward to Punta San Miguel were surveyed (August 22-September 9, 1959) by the California Department of Fish and Game research vessel *Alaska* to sample young sardines for determining the relative abundance and distribution of fish resulting from the 1959 spawning. Other objectives were to sample adult sardines, Pacific mackerel, jack mackerel, and anchovies; to collect live sardines for the genetic studies conducted by the U. S. Bureau of Commercial Fisheries Biological Laboratory at La Jolla; to tag barracuda; to collect specimens as requested by other investigations; and to troll for albacore while en route to Turtle Bay.

A total of 63 night light stations was occupied. Sardines were collected at 24, Pacific mackerel at 21, anchovies at 18, and jack mackerel at 15.

Sardines were sampled throughout the survey area and were not confined to definitive areas as in previous surveys this year. Of the 24 sardine samples 12 contained 1959 year-class fish and most ranged in size from 80 to 115 mm. standard length. Two samples of young sardine, one collected in Turtle Bay and one in Todos Santos Bay, consisted of smaller fish ranging in standard length from 34 to 70 mm.

A total of 205 miles was scouted between stations at night and 68 schools were sighted. Of this total 11 were identified as anchovy, 5 as sardines,



M/V Alaska Cruise 59-A-7 Pelagic Fish (August 22-September 9, 1959).

and 52 unidentified. Visual scouting conditions were poor with choppy seas prevalent during the first portion of the cruise and adverse bioluminescence prevailed throughout the survey area.

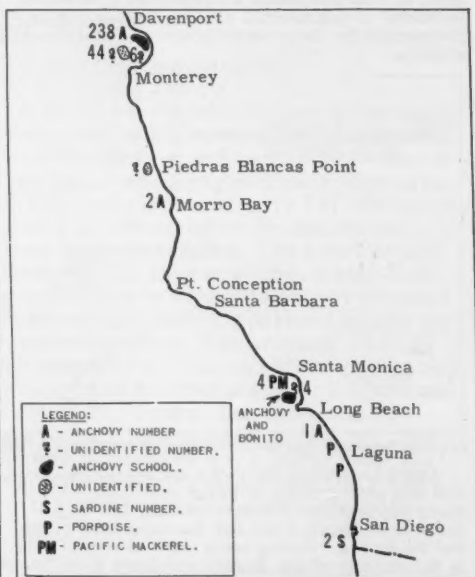
A total of 119 California barracuda was tagged with type "G" spaghetti tags--50 fish were caught at San Martin Island and 69 were captured in the Cape Colnett-Punta San Telmo area. All fish were released in the Cape Colnett-Punta San Telmo area. Two tagged barracuda were recaptured at San Martin Island after being at liberty 108 and 112 days, respectively. Initially the two fish were tagged off Cape Colnett, approximately 30 nautical miles north of the recapture area.

No albacore were taken on the offshore trolling track while en route to Turtle Bay.

Airplane Spotting Flight 59-15-Pelagic Fish: The inshore area from the Mexican border to Davenport was surveyed from the air (September 15-17, 1959) by the Department's Cessna 170 (1359D) to determine the distribution and abundance of pelagic fish schools.

Poor visibility hampered observations between Point Dume and Morro Bay and the first storm of the central California season made observation north of Monterey Bay impossible.

In general, pelagic fish schools were scarce in the region surveyed, Monterey Bay, Santa Monica Bay, and the area off Sierra Nevada Point being the only places where school groups were observed. As had been the case during the two previous surveys, a moderate concentration of anchovies was seen in the northern portion of Monterey Bay. This group consisted of 238 typically thin, spread out, shallow-water schools, extending from the Pajaro River to the town of Santa Cruz and seaward to approximately the 20-fathom curve. The water in this portion of Monterey Bay was quite dirty, ranging in color from gray-brown to brick-red. In addition, 50 large, deep, unidentified schools were seen due west of Moss Landing; 6 were four miles offshore and 44 were 10 miles off at the outer limit of the bay.



Airplane Spotting Flight 59-15 (September 15-17, 1959).

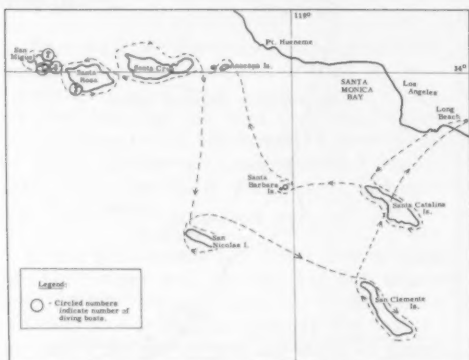
A small group of "breezing" schools was encountered two miles off Sierra Nevada Point. No accurate count or species identification was possible.

On the morning of September 15, near Rocky Point in Santa Monica Bay, it was possible to observe a large number of bonito feeding on a concentration of small anchovies. The anchovy schools had broken up into many very small, tight balls and the area seemed to be completely underlaid with bonito, which could be seen flashing below and through the small anchovy spots. It was apparent that in only a matter of time the anchovies would be completely decimated. Many of the spots became noticeably smaller during the time the airplane was overhead. The erratic and frantic behavior of both the anchovy schools and the bonito made it impossible to estimate the magnitude of

either group although the activity was going on within an area approximately one-half mile square. The Department's research vessel *Dolphin* was in the area at the time and personnel aboard were able to make positive identification of the species and describe the phenomenon as seen from the surface.

Aside from the aforementioned schools, the following were observed during the flight: 2 small sardine schools off the Coronado Strand; 2 large porpoise schools (several hundred individuals) 2 to 3 miles off Laguna Beach and Newport Beach; 1 large anchovy school near the Huntington Beach pier; 4 unidentified schools near the Redondo Beach barge; 4 thin Pacific mackerel schools south of Malibu pier; and 2 small anchovy schools just north of Morro Rock.

Airplane Spotting Flight 59-16-Abalone: The Channel Islands area was surveyed from the air on September 20, 1959, by the California Department of Fish and Game's Beechcraft to observe locations of commercial abalone fishing and to photograph the Department's abalone experimental stations.



Airplane Spotting Flight 59-16-Abalone (September 20, 1959).

Conditions were favorable for aerial observation and photography, although surf conditions among the northern Channel Islands, San Miguel, Santa Rosa, Santa Cruz and Anacapa were rough for the divers. Diving boats were observed only in the vicinity of San Miguel and Santa Rosa Islands and only 1 of 8 observed was active and had a diver on the bottom. No boats were observed among the southern Channel Islands (San Clemente, Santa Catalina, Santa Barbara and San Nicholas).

Kelp growth appeared to be good around the islands compared to conditions observed in March 1959, although in some areas along the landward side at Santa Catalina and San Clemente, kelp growth was sparse.

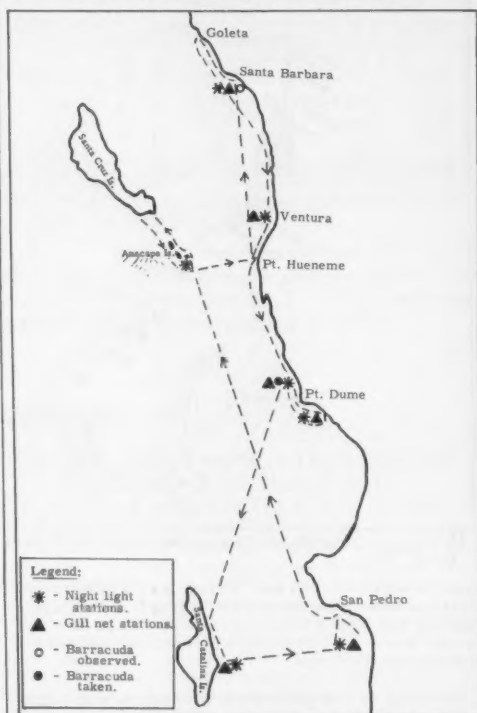
Notes: Also see *Commercial Fisheries Review* September 1959 pp. 20 and 22, and December 1959 p. 39.

BARRACUDA AND WHITE SEA BASS SURVEY OFF SOUTHERN CALIFORNIA COAST CONTINUED:

M/V "N. B. Scofield" Cruise 5956-Barracuda-White Sea Bass: The southern California waters, from

Goleta south to the Horseshoe Kelp off Long Beach and certain offshore islands were surveyed (September 15-23, 1959) by the California Department of Fish and Game research vessel *N. B. Scofield*. The objectives were: (1) to tag and release barracuda; (2) to explore for currently unexploited groups of barracuda; (3) to explore for small white sea bass in inshore waters; (4) to develop methods of catching small white sea bass in suitable condition for tagging; and (5) to tag white sea bass and either hold them in shipboard tanks and/or release them.

Trolling lines were the principal gear employed for locating barracuda schools: 4 to 8 lines, fished at varying depths, were trolled continuously throughout the trip when traveling at trolling speeds.



M/V *Scofield* Cruise 5956 Barracuda-White Sea Bass (September 14-23, 1959).

When at anchor for the night gill nets were used, conditions permitting. A floating gill net of variable mesh was fished from the stern of the vessel while an anchored net of 3-inch mesh was fished independently of the vessel.

Other fishing methods included rod and reel employing live bait or artificial lures; a 1,500-watt night light suspended over the water at the stern of the vessel; dip-netting and brailing.

California barracuda were taken at only one station during the trip, a spot 3.8 miles north of Point Dume. The barracuda were captured in a 3-inch cotton gill net, set at right angles to a kelp bed, in approximately 45 feet of water. All but

one of the fish were taken within 18 inches of the lead line. One other barracuda was hooked on live bait at this location but was not landed. The only other barracuda observed on the trip were several fish seen swimming about at the night light station at Santa Barbara.

Because of the scarcity of barracuda the entire trip was devoted to barracuda fishing and no concerted effort was made to take white sea bass.

Water temperatures were fairly uniform throughout the trip with night lows of 18°C . (64.4°F .), and the daytime highs ranging up to 21.6°C . (70.9°F .). The warmest temperatures during the cruise were encountered at Santa Catalina Island, where the range was from 21.3° to 22.5°C . (70.3° to 72.5°F .).

Bonito were the most abundant species in all areas visited with the largest specimens obtained at Santa Cruz Island. It was difficult to remain and chum in any area for any length of time without attracting a school of these fish to the boat.

In all, 20 different species of fish and 2 species of invertebrates were caught.

Notes: Also see Commercial Fisheries Review, September 1959 p. 21.

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RADIOACTIVE CONTAMINATION IN FISH AND SHELLFISH TO BE MONITORED:

Increased concern for the possible hazards of atomic energy on California's ocean fish and shellfish has prompted the California Department of Fish and Game to establish a position to deal with radioactive contamination, the Department announced on October 16, 1959

The new position, supervisor of radioactive monitoring and surveillance, will be filled by an expert in biochemistry, chemistry, and game and marine invertebrate zoology.

"The increased activity in the radioactive field in California makes it necessary that the Department determine what is happening to the fish and game resources," the Department stated. "The fact that aquatic and marine organisms have a unique property of concentrating radio-active materials makes this area one of very great concern."

Several areas of concern have already made themselves apparent, he noted. Certain shellfish off northern California are reported to have radio-

active levels many times over the background level of their environment. Some mollusks of southern California likewise are reported to have "warmed up."

The Department will work with other State agencies, particularly the Departments of Public Health, Water Resources, Agriculture, and Industrial Welfare. Analytical work will be carried out in cooperation with the California State Disaster Office. The Department's program will be under the Marine Resources Branch in Sacramento.



Canned Fish

CONSUMER PURCHASES, SEPTEMBER 1959:

Canned tuna purchases by household consumers in September 1959 were 956,000 cases, of which 58,000 cases were imported. By type of pack, domestic-packed tuna purchases were 187,000 cases solid, 615,000 cases chunk, and 96,000 cases grated or flakes. The average purchase was 2.0 cans at a time. About 30.8 percent of the households bought all types of canned tuna; only 1.8 percent bought the imported product. The average retail price paid for a 7-oz. can of domestic solid or fancy was 35.3 cents and for a $6\frac{1}{2}$ oz. can of chunk 27.7 cents. Imported solid or fancy was bought at 29.4 cents a can. September purchases were lower than the 966,000 cases bought in August by 1.0 percent; retail prices in most cases were slightly higher.

During September household consumer purchases of California sardines were 35,000 cases; and 32,000 cases imported sardines. The average purchase was 1.6 cans at a time for California sardines and 1.9 cans for imported. Only 1.4 percent of the households bought canned California sardines and 2.3 percent imported. The average retail price paid for a 1-lb. can of California sardines was 24.0 cents, and for a 4-oz. can of imported 25.0 cents. Retail prices were lower for both California and imported canned sardines. September purchases of California sardines were higher than the 34,000 cases bought in August by 2.9 percent.

Canned salmon purchases in September 1959 were 198,000 standard cases, of which 103,000 cases were pinks and 44,000 cases reds. The average purchase was 1.2 cans at a time. About 14.2 percent of the households bought all types of canned salmon; 7.0 percent bought pinks. The average retail price paid for a 1-lb. can of pink was 58.5 cents and for red 89.0 cents. September purchases were down about 1.5 percent from the 201,000 cases bought in August.



Cans--Shipments for Fishery Products, January-August 1959

Total shipments of metal cans for fishery products during January-August 1959 amounted to 79,870 short tons of steel (based on the amount of steel consumed in the manufacture of cans) as compared with 78,679

tons in the first eight months of 1958. Canning of fishery products in August 1959 included tuna, Maine sardines, salmon, shrimp, and jack and Pacific mackerel. Shipments of metal cans rose 2.8 percent from July to August 1959, but dropped 15.8 percent from August 1958 to August 1959.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. Reported in base boxes of steel consumed in the manufacture of cans, the data for fishery products are converted to tons of steel by using the factor: 23.0 base boxes of steel equal one short ton of steel.



Central Pacific Fishery Investigations

SKIPJACK TUNA BEHAVIOR STUDIES OFF HAWAII CONTINUED:

M/V "Charles H. Gilbert" Cruise 46:
The study of the behavior of tuna in Hawaiian waters was continued (September 15-October 18, 1959) by the fishery

research vessel Charles H. Gilbert of the U. S. Bureau of Commercial Fisheries Biological Laboratory at Honolulu.

Tuna Behavior Studies: Four skipjack schools were fished for experimental purposes and also to obtain live fish for use in pond studies. Observations were made on tuna behavior during the alternate use of various bait species (moiaio mixture, mullet, nehu, tilapia), and when the tuna encountered squid, a natural food. Three 6-pound skipjack were inoculated with thorazine and 11 others were confined without drugs. Two drugged fish and 5 controls were transferred to the Kewalo pond where maximum survival was 41 hours. The single dolphin captured died at sea.

California Current Extension Survey: Bathythermograph casts were made at 3-hour intervals throughout the survey and with each cast water samples were collected for salinity determinations. The salinities were determined aboard ship. The results were used to define the general track in the western area. In addition, five water samples were frozen for inorganic phosphate analyses.

The salinity distribution indicated that the northern type water (salinity greater than 35.0 ‰) had penetrated into the waters surrounding the major islands of the Hawaiian chain. The islands in the southeastern portion of the archipelago were completely encompassed by this northern type water, whereas in the northwestern sector high salinity water was located only on the northern side of the islands. The California Current Extension was relatively narrow and pronounced south of the island of Hawaii becoming wide and diffuse to the west.

A total of 29 bird flocks was sighted during the current survey. At least 10 of these flocks were not actively feeding and were observed flying high above the water surface. Live-bait fishing with tilapia as chum was attempted on 1 yellowfin tuna, 1 mahimahi, and 3 skipjack tuna schools. Only one of the skipjack schools responded to the chum and was successfully fished with a catch of 142 fish. Fifty-four were tagged with the Floy dart tag and released. The

skipjack ranged in size from 10-18 pounds.

Long-line gear was fished at 3 locations. The catches were considered poor, both in terms of numbers and species caught. The total catch consisted of 1 yellowfin, 2 big-eyed, and 1 skipjack tuna, 1 striped marlin, 2 sailfish, 4 white-tip sharks, 4 great blue sharks, 4 mahimahi, and 1 *Alepisauris*.

Temperature Discontinuity Studies:

Five $\frac{1}{2}$ -hour surface plankton hauls with a 1-meter net were made across a temperature discontinuity encountered south of the island of Molokai. The temperature gradient consisted of a 1-degree (80.0° F. to 81.0° F.) change in surface temperature which occurred within 5 minutes of traveling at 8-9 knots. Additional data collected were subsurface temperatures at close intervals with the bathythermograph and water samples for both inorganic phosphate and salinity determinations.

Sampling for Serological Studies:

Twenty-four 0-60 meter plankton samples, from which tuna larvae will be

separated, were preserved and frozen in 10-percent formalin, 70-percent methanol, and sea water.

Whole blood samples from eight skipjack were preserved and frozen in a glycerol-citrate solution.

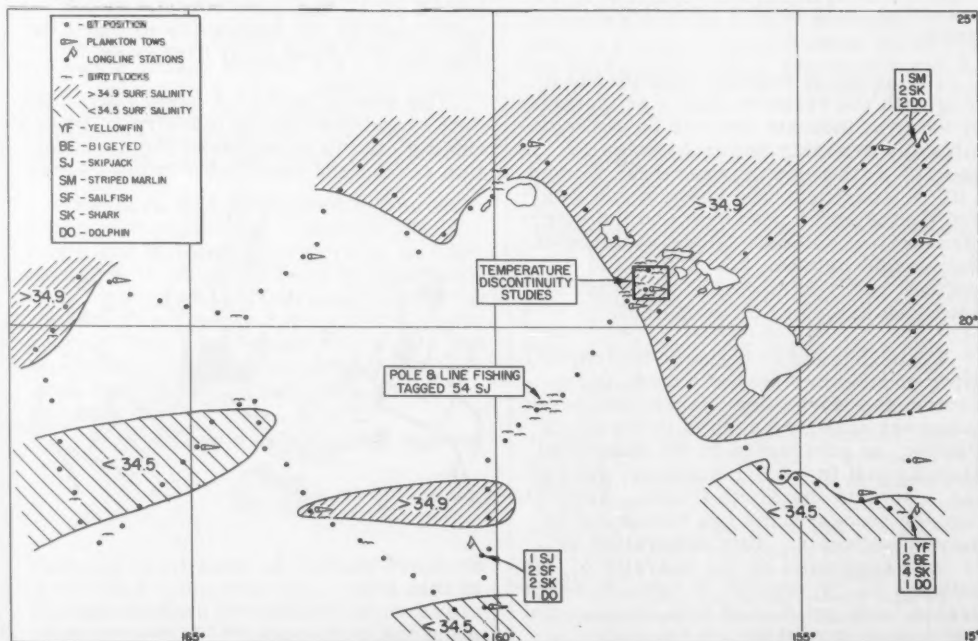
Meat samples from 10 skipjack were frozen and returned to the laboratory.

Notes Also see Commercial Fisheries Review, September 1959 p. 27, and November p. 30.

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STUDIES SHOW SEPARATE STOCKS OF ALBACORE TUNA NORTH AND SOUTH OF THE EQUATOR IN CENTRAL PACIFIC OCEAN:

A study of the sexual maturity and the time and area of spawning of albacore tuna in the central South Pacific Ocean indicates that the stocks north and south of the equator are separate. This study by the Honolulu Fisheries Biological Laboratory of the U. S. Bureau of Commercial Fisheries is based on the examination of gonads collected from albacore landed in American Samoa.



M/V Charles H. Gilbert Cruise 46 (September 15-October 18, 1959).

Albacore are landed in American Samoa throughout the year. A continuous series of samples could thus be obtained for the study of seasonal variation in gonad development. In July 1957, arrangements were made to obtain gonad samples from seven randomly-selected albacore from each landing. Gonads from both sexes were collected to assure complete randomness in sampling. A total of 1,772 pairs were collected during the period July 1957 to September 1958.

At the laboratory the gonads were weighed. No further work was done with the testes. The ovaries were sectioned, examined by microscope, and the stage of development recorded. A sample of 25 of the largest ova were measured.

The relative stages of maturity of the ova were examined with respect to the time of capture. The proportion of ovaries in the "late development" stage increased from July 1957 to a maximum in December-January and declined to a minimum in May 1958. The proportion increased in June 1958. The annual spawning cycle is thus tentatively defined.

The areas of capture, considered along with the relative stages of maturity of the ova, indicate that the South Pacific albacore probably spawn between 10° S. and 20° S. latitude between 140° W. and 170° E. longitude, the eastern and western limits of the area from which samples were received. Those samples of fish caught between 20° S. and 30° S. latitude had ovaries which were not in advanced stages of development.

While there may be some intermingling of albacore stocks across the equator, the November-March (southern summer) spawning season in the South Pacific, as contrasted to the suspected May-August (northern summer) spawning season in the North Pacific, suggests that the stocks in the two hemispheres may be separate. This separation is further suggested by the scarcity of fish between 20° N. and 10° S. latitude as revealed from catches of both commercial and research vessels.

In addition, tagging experiments have shown Pacific-wide albacore movements in the Northern Hemisphere, but no tagged albacore released in the North Pacific have been recaptured in the South Pacific.

The results of the albacore gonad sampling in the South Pacific and studies of the distribution and size composition of albacore in both hemispheres, along with data available from other research activities and from commercial fisheries, all support the hypothesis that there are separate albacore stocks in the two hemispheres and that their distribution approximates a mirror image.



Consumption

SURVEY OF FISH CONSUMPTION IN PUBLIC EATING PLACES COMPLETED:

A survey of the consumption of frozen processed fish and shellfish in institutions and public eating places in ten selected cities has been completed and submitted by the contractor to the U. S. Bureau of Commercial Fisheries.

The survey provides basic marketing data to aid the fishing industry in its continuing efforts to increase the consumption of fish and shellfish. In the course



of this study, approximately 4,400 interviews were obtained in order to determine the proportion of establishments

using frozen processed fish, shellfish, and fish portions; quantities purchased according to species; sources of supplies; attitude as to the quality and condition of the merchandise received from the suppliers; ideas on packaging and profitability of serving frozen processed fishery products; methods of cooking; awareness and usage of government-inspected fishery products; reasons for not using frozen processed fishery products; and other information which might be developed during the interview.

Four classes of establishments were defined for this study and included: establishments primarily engaged in serving foods to the general public (restaurants, cafeterias, etc.); establishments serving food to limited groups of people (schools, industrial plants, commercial enterprises); establishments serving foods to captive groups of people (hospitals, prisons, etc.); and miscellaneous establishments (drug stores, lunch counters, clubs).

The results of the survey will be published in 11 sections, one for each of the cities and a Technical Appendix describing the methods used in the study. Interviews for this project were made in the following cities, Atlanta, Ga.; Chicago, Ill.; Cleveland, Ohio; Denver, Colo.; Houston, Tex.; Los Angeles, Calif.; Omaha, Nebr.; Portland, Ore.; Springfield, Mass.; and New York City.

The work was sponsored by the Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service, and was financed with funds provided by the Saltonstall-Kennedy Act to increase production and markets for the domestic fishing industry. The actual field interviews and tabulations were performed by a New York City research firm at a cost of \$57,000.

Note: Also see Commercial Fisheries Review, September 1958 p. 37.



Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE
PURCHASES, JANUARY-OCTOBER 1959:
Fresh and Frozen Fishery Products
For the use of the Armed Forces under

the Department of Defense, 1.9 million pounds (value \$1.1 million) of fresh and frozen fishery products were purchased in October 1959 by the Military Subsistence Supply Agency. This exceeded the

Table 1 - Fresh and Frozen Fishery Products Purchased by Military Subsistence Supply Agency, October 1959 with Comparisons

QUANTITY				VALUE			
October		Jan.-Oct.		October		Jan.-Oct.	
1959	1958	1959	1958	1959	1958	1959	1958
..... (1,000 Lbs.) .....				..... (\$1,000)			
1,945	1,507	19,433	19,382	1,062	855	110,035	111,059

quantity purchased in September by 10.6 percent and was 29.1 percent higher than the amount purchased in October 1958. The value of the purchases in October 1959 was up by 14.9 percent as compared with September and 24.2 percent more than for October 1958.

During the first ten months of 1959 purchases totaled 19.4 million pounds (valued at \$10.0 million)--an increase of 0.3 percent in quantity but lower by 9.3 percent in value as compared with the similar period of 1958.

Prices paid for fresh and frozen fishery products by the Department of Defense in October 1959 averaged 54.6 cents a pound, about 2.0 cents more than the 52.6 cents paid in September and 2.1 cents less than the 56.7 cents paid during October 1958.

Canned Fishery Products: Salmon was the principal canned fishery product pur-

Table 2 - Canned Fishery Products Purchased by Military Subsistence Supply Agency, October 1959 with Comparisons

Product	QUANTITY				VALUE			
	October		Jan.-Oct.		October		Jan.-Oct.	
	1959	1958	1959	1958	1959	1958	1959	1958
	..... (1,000 Lbs.) .....				..... (\$1,000)			
Tuna	100	-	2,602	3,931	44	-	1,203	1/
Salmon	653	1,381	671	2,783	456	761	470	1/
Sardine	51	-	1,025	93	21	-	165	1/

1/Unavailable.

chased for the use of the Armed Forces during October this year. In the first 10 months of 1959, purchases of canned tuna were lower by 33.8 percent, canned salmon lower by 75.9 percent, but canned sardine purchases increased elevenfold as compared with January-October 1958.

Note: Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than indicated because local purchases are not obtainable.

□□□□□□□

Federal Aid Funds for Sport Fish and Wildlife Restoration Allotted to States for Fiscal Year 1960

Federal Aid funds totaling \$20.6 million, which includes the last of the five Pittman-Robertson "backlog" allotments of almost \$2.7 million each, have been apportioned to the states for their fish and game restoration programs for the year ending June 30, 1960, the Secretary of the Interior announced on November 18, 1959. Fish restoration funds for fiscal year 1960 amount to \$5.3 million; game restoration, \$15.3 million. The program is administered by Bureau of Sport Fisheries and Wildlife of the U. S. Fish and Wildlife Service.

Apportionments of Federal Aid Funds to States for Sport Fish and Wildlife Restoration, Fiscal Year 1960

States	Sport Fishing	Wildlife
Alabama	\$100,569.39	\$278,169.87
Alaska	263,500.00	790,000.00
Arizona	94,220.77	334,814.01
Arkansas	15,962.61	244,807.77
California	263,500.00	715,651.11
Colorado	117,618.54	351,939.01
Connecticut	52,700.00	79,000.00
Delaware	52,700.00	79,000.00
Florida	106,843.39	222,612.58
Georgia	100,499.30	256,548.51
Hawaii	52,700.00	79,000.00
Idaho	83,269.54	296,603.43
Illinois	154,089.16	394,056.93
Indiana	139,962.69	417,762.83
Iowa	89,789.30	310,712.66
Kansas	83,751.76	300,296.72
Kentucky	82,924.33	249,518.82
Louisiana	57,324.44	261,916.05
Maine	52,700.00	170,568.56
Maryland	52,700.00	105,732.40
Massachusetts	52,700.00	82,929.89
Michigan	214,605.89	487,518.57
Minnesota	263,500.00	368,367.80
Mississippi	58,432.52	221,896.64
Missouri	136,064.65	347,067.67
Montana	123,173.59	473,192.84
Nebraska	74,045.23	274,876.58
Nevada	72,928.50	296,096.40
New Hampshire	52,700.00	79,000.00
New Jersey	52,700.00	99,289.38
New Mexico	88,700.54	350,799.04
New York	148,425.26	608,667.74
North Carolina	87,252.12	312,438.10
North Dakota	52,700.00	231,876.75
Ohio	154,402.37	444,084.00
Oklahoma	110,363.30	266,308.45
Oregon	111,651.99	380,558.49
Pennsylvania	119,178.89	590,597.68
Rhode Island	52,700.00	79,000.00
South Carolina	54,638.58	159,295.84
South Dakota	63,679.06	270,605.28
Tennessee	127,556.15	308,364.23
Texas	263,500.00	790,000.00
Utah	70,748.64	288,185.17
Vermont	52,700.00	79,000.00
Virginia	81,724.27	300,999.00
Washington	98,507.82	308,869.39
West Virginia	52,700.00	194,397.31
Wisconsin	197,180.32	331,460.62
Wyoming	83,515.09	312,323.89

¹Portion of funds in the aggregate sum of \$523,221.99 temporarily withheld pending receipt of acceptable certification of paid hunting license holders.

These funds are derived from Federal excise taxes collected from the manufacturers--an 11-percent tax on sporting guns and ammunition for the restoration of game (Pittman-Robertson Act, approved September 2, 1937) and a 10-percent tax on fishing rods, reels, creels, and artificial lures, baits and flies (Dingell-Johnson Act, approved August 9, 1950). Both taxes apply on the manufacturer's price.

Guam, which became eligible for Federal Aid in 1958, Puerto Rico, and the Virgin Islands each receive \$12,000 a year for game restoration programs and \$10,000 each for fish restoration.

Federal Aid money is matched by state money on the basis of \$3 Federal Aid to \$1 state funds, although in actual practice the states carry out all projects with their own funds, and are reimbursed for up to 75 percent of project costs.

To obtain the benefits of the Federal grants, the states submit project proposals to the Bureau of Sport Fisheries and Wildlife. When Federal Aid projects are approved by the Bureau, the states fish and game departments proceed to carry out the plans, spending their own funds. The states then submit reimbursement claims for 75 percent of the costs of the project, either periodically or at the completion of the work. All equipment, lands, and structures become the property of the states. All project workers are hired by the states and are state employees.

Noter Also see *Commercial Fisheries Review*, December 1958, p. 34.



Fish Flour

POTENTIAL COMMERCIAL VALUE:

Edible fish flour might well be our most nutritionally-important, economically-valuable, and politically-significant fishery product of the future.

At the fall 1959 meeting of the American Fisheries Advisory Committee in Newport News, Va., the members, their wives, and guests were served chocolate chip cookies made with an ordinary package mix to which 2 tablespoonsful of whole menhaden edible fish flour were added.

None of those present were aware of the addition of fish flour until the concluding speaker told them about it, because the U. S. Bureau of Commercial Fisheries' home economists had made certain that the cookies with fish flour looked, tasted, and crumbled exactly the same as cookies any homemaker might make with the same packaged mix. The

nutritional difference, however, was tremendous.

"If you ate the same number of cookies as I did," the speaker told them, "amazingly enough we got nearly one-fifth of our daily requirement of animal protein."

The fish flour is made tasteless, nearly white, and odorless by removing the last trace of fish oils. The flour will keep nearly indefinitely as samples have been stored at room temperature for more than a year without spoiling.

Fish flour, which is more than 80 percent high-quality protein, can benefit both the fishing industry and the consumer. Industry could prepare fish flour during times when raw fish are in abundant supply for future use when supplies are short. Fish flour, properly dried and defatted, can be shipped and stored easily and inexpensively. In addition, it provides a low-cost additive to other food preparations. The consumer would benefit because nearly two-thirds of the world's population have a need for more animal protein.

Feeding overpopulated nations apparently is not a problem that must be faced only by certain countries. In the future this may be a world-wide problem. The products of the sea apparently hold the answer. It has been estimated that the potential of our oceans is 500 million tons of food annually. A problem remaining after harvesting this potential is one of processing to insure that the harvest is suitable, readily available, and given optimum utilization for food. A satisfactory fish flour offers a solution to this problem.



Fishways

PROBLEMS OF PASSAGE OF FISH OVER OXBOW DAM DISCUSSED AT CONFERENCE:

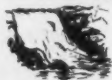
During the late summer and fall 1959 months, the Idaho Power Company and Federal and State fishery agencies have been considering what temporary or permanent facilities should be used in

passing anadromous fish at the Hells Canyon and Oxbow Dams.

The fishery agencies had contemplated releasing adult fish in the forebay of the Hells Canyon Dam so that they can swim upstream to Oxbow Dam. This would permit the two tributaries just below Oxbow Dam to continue producing anadromous fish runs and reduce excessive hauling of adult fish. The remaining fish bound for spawning areas above would then be collected at the permanent upstream migrant facilities at Oxbow Dam and hauled above Brownlee Dam to proceed to their ancestral spawning area.

It was agreed at a conference held at Washington, D. C., on June 11, 1959, that the Idaho Power Company and the fishery agencies would consider a proposal of the Company to modify an existing order of the Federal Power Commission. The Company proposes passing fish from Hells Canyon Dam directly to the Brownlee Reservoir, thus eliminating from production the tributary streams entering the Snake River below the Oxbow Dam. The principal reason for making this proposal is to cut the cost of fish handling. Several alternative methods of passing fish have been under consideration since the meeting.

The Company, however, has informed the Federal Power Commission by letter of September 4, 1959, that the cost of facilities proposed by the fishery agencies exceeds their proposed method of handling the fish by about \$1,700,000 for original construction cost and exceeds the annual operating cost by \$200,000. The Company has requested a final determination by the Commission in the matter and has requested that a hearing be set at the earliest possible date.



Great Lakes

LAKE SUPERIOR ADVISORY COMMITTEE REPORTS ON FISHERY TRENDS:

The Lake Superior Advisory Committee met about mid-November in Baraga, Mich., to "advise the Great Lakes Fisheries Commission on matters pertaining to sea lamprey control, lake trout rehabilitation, and other related matters." Representatives were present from Minnesota, Wisconsin, Michigan, the Great Lakes Fisheries Commis-

sion, U. S. Bureau of Commercial Fisheries, and U. S. Bureau of Sport Fisheries and Wildlife. It was reported that progress in the control of the sea lamprey has been effected by three methods--mechanical barriers, electrical barriers, and the newer chemical treatment. Much of the control work centered in Michigan and Wisconsin streams and significant reductions have been made in some areas.

Because of the rapid progress in the development and application of methods to control the lamprey, the Commission is actively engaged in means of rehabilitating the lake trout.

The lake trout commercial fishery in the Isle Royal and Minnesota areas was smaller for 1959, the poundage of large trout was less, and the total catch was down, according to a representative from Minnesota. The small one-pound trout was down but the two- and three-pound trout seemed to be plentiful.

Even though there were some encouraging reports of trout in Lake Superior, experts warned not to view the future with optimism. The Superior lake trout production of about 1.5 million pounds in 1958 was 69 percent less than the 1950 production, and 38 percent less than the 1956 catch.

To assist in the rehabilitation program, the U. S. Bureau of Commercial Fisheries is operating two research vessels in Lake Superior. The vessels are experimentally fishing with mesh gill nets and especially designed trawls. This will give information on the younger age-classes of trout, some of which already indicates a severe shortage of young age trout. Fishing over the known spawning grounds gives information on the extent of fall spawning.

In past years eggs have been obtained from Lake Superior for use in the hatcheries, but native fish are now so hard to find, other sources are being sought. In some hatcheries brood stocks are being developed and collections from various inland lakes have been started by Federal and state agencies.

Minnesota will attempt to carry out spawn-taking operations in three inland lakes along the Gunflint Trail area. The lakes are Musquash, Daniels, and Saganaga. Trap and gill nets are used. In addition, the research section planned to use an electrical shocking device to capture mature trout on the spawning grounds. The work will be carried out at night.



Great Lakes Fisheries

Exploration and Gear Research

LAKE ERIE EXPLORATORY SMELT FISHING:

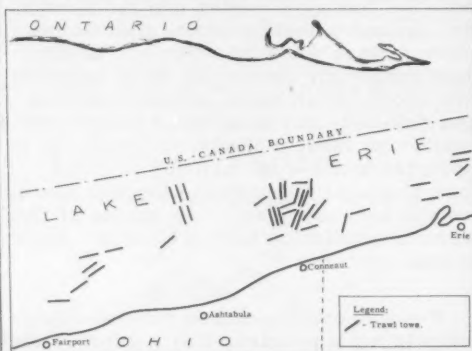
The Great Lakes Exploratory Fishing and Gear Research program of the U. S. Bureau of Commercial Fisheries is assisting the commercial industry of the Great Lakes by trying to find new fishery resources. Also included are ways of fishing the resources found by the introduction and development of suitable gear.

A major project, undertaken in cooperation with the Ohio Division of Wildlife, has involved ways and means of profitably catching commercial quantities of smelt in Lake Erie. Using the Bureau-chartered M/V Active, experiments have been conducted with Gulf of Mexico-type trawls and with the adaption of trawling gear to existing Great Lakes fishing vessels.

These efforts have been successful. During the fall of 1959, 7 tons of smelt were landed in one day which shows that trawling for that species in Lake Erie has commercial possibilities.

EXPERIMENTAL TRAWLING FOR SMELT IN LAKE ERIE YIELDS COMMERCIAL QUANTITIES:

M/V "Active" Cruise 6: Commercial quantities of smelt were taken throughout the deeper waters of east central Lake Erie, between Fairport Harbor, Ohio, and Erie, Pa., during a 17-day cruise (September 22-October 8, 1959) of the U. S. Bureau of Commercial Fisheries chartered vessel Active. The purpose of the cruise was to gather additional information on the smelt fishery potential and to attempt commercial-scale production.



M/V Active Cruise 6 (September 22-October 8, 1959).

Forty-one trawl tows with a 50-foot two-seam balloon trawl, fitted with a one-inch mesh cod-end, produced over 52,000 pounds of smelt and small amounts of burbot, yellow perch, and herring. The best fishing results were obtained in 11-, to 13-fathom depths from Ashtabula to Conneaut, Ohio, where catch rates of smelt (8 to 20 to the pound) ranged from 2,200-5,000 pounds an hour, the best day's fishing yielded 14,000 pounds of marketable smelt. Smaller concentrations of smelt found northwest of Erie, Pa., produced trawl catches up to 1,500 pounds an hour. Gear damage was light.

Four days fishing were lost due to bad weather and winds up to 40 miles an hour. The adverse weather had little observed effect upon the smelt concentrations. Surface schools of emerald shiners were observed in the Conneaut and Erie areas. No seine sets were attempted.

Surface water temperatures were observed to be considerably cooler than during cruise 5 with a range of 66° F. to 68.5° F. Bottom temperatures ranged from 48° F. to 58° F.

Note: Also see *Commercial Fisheries Review*, December 1959 p. 49.

Great Lakes Fishery Investigations

SURVEY OF EASTERN LAKE SUPERIOR CONTINUED:

M/V "Cisco" Cruise 7: During the cruise the Cisco operated in southeastern Lake Superior from Marquette to Batchawana Bay, as in cruises 1, 3, and 5.

Standard gangs of gill nets were set at 20 fathoms off Marquette; 15 fathoms in Shelter Bay; 35 fathoms in Munising Bay (2 gangs); 25, 50, 75, and 100 fathoms off Grand Marais; and 25, 35, 50, and 70 fathoms in Whitefish Bay. In addition, a standard gang minus the larger mesh sizes (4 to 6 inches) was set at 5 fathoms in Munising Bay.



Research vessel of the Service's Great Lakes Fishery Investigations.

The gill nets set off Marquette took only 5 lake trout, 5 burbot, 8 smelt, and 4 lake herring. The nets in Shelter Bay caught an unusually large number of longnose sucker (255), and little else (3 lake trout, a few whitefish, smelt, herring, a single burbot). The catch in the shallow set in Munising Bay was dominated by yellow perch (95) and round whitefish (56). Small numbers of whitefish, longnose sucker, white sucker, smelt, and one rainbow trout were also taken. The catch from the deeper sets in Munising Bay consisted mostly of *Leucichthys hoyi* (average 150 per set) and whitefish (30 per set), plus a few smelt and 3 lake trout.

A total of 25 lake trout was taken in gill nets at 25 fathoms and one at 50 fathoms off Grand Marais. One of these trout bore a fin-clip indicating it was stocked. Chub catches off Grand Marais were light at 25, 50, and 100 fathoms (45, 75, and 100 chubs, respectively) and moderate at 75 fathoms (141). Catches were mostly *L. hoyi* at 25 fathoms, *L. reighardi* at 50 fathoms, and *L. kiyi* in the deeper sets. A few *L. nigripinnis* and lake herring were taken at all depths. The only other species taken off Grand Marais were burbot (4 at 25 fathoms) and smelt (2 at 25 fathoms).

No lake trout were caught in gill nets set in Whitefish Bay. Chub catches were light at 25 and 35 fathoms (36 and 80, respectively), heavy at 50 fathoms (364) and moderate at 70 fathoms (129). *L. hoyi* made up 86, 80, and 65 percent of the catches at 25, 50, and 70 fathoms, respectively, but was slightly less numerous than *L. reighardi* at 35 fathoms. *L. kiyi*, *L. nigripinnis*, and *L. zenithicus* were caught in only small numbers. Other species were smelt (92 at 25 fathoms), alewife (only one), and an occasional burbot, white sucker, perch, and pygmy whitefish.

Trawling operations were carried out at depths ranging from 3 to 10 fathoms off Marquette, 15 to 25 fathoms in Shelter Bay, and 10 to 20 fathoms off Grand Marais. No age-group 0 lake trout were netted. Catches were mostly ninespine sticklebacks (more than 1,500 per 10-minute tow off Grand Marais) and slimy sculpins, plus a few smelt fry, trout-perch, and age-group 0 alewives. The alewives were taken from a sandy bottom about 3 miles southeast of Marquette and are believed to be the first young alewives taken from Lake Superior.

Surface water temperature averaged about 14° C. (57.2° F.) at the beginning of the cruise and 13° C. (55.4° F.) at the end. Extremes were 15.6° C. (60.0° F.) and 12.8° C. (55.0° F.). The metalimnion for the most part continues to be well defined in deep-water areas.

Cruise 8: Activities of the U. S. Bureau of Commercial Fisheries research vessel Cisco during October 13-29, 1959, were severely restricted due to extremely bad weather. The primary objective of this cruise was to ascertain the general status of the spawning stock of lake trout in the Marquette, Mich., area of Lake Superior, by setting gill nets on known spawning reefs. Four lifts, each of about 4,500 feet of large-mesh (4- to 6-inch) gill net, were made. Only two lake trout, both ripe males, were caught on the reefs. These meager data, of course, suggest a very small spawning stock. Nets set in this area in 1952 and 1953 took 157 and 65 pounds of spawning lake trout per 1,000 feet of gill net, respectively, while nets set this cruise took 0.5 pounds of spawning lake trout per 1,000 feet of net.

Moderate numbers of longnose suckers, and a few burbot and whitefish (the largest 9 pounds) were also caught in the large-mesh nets. Small amounts of 1½- and 2-inch mesh attached to the large mesh took round whitefish (up to 35 per lift), smelt, and longnose dace (*Rhinichthys cataractae*). The stomachs of all species but the dace were examined for lake trout eggs, and none were found.

Standard gangs of gill nets were set at 25, 50, 75, and 100 fathoms off Marquette. The 25- and 50-fathom sets were for 1 night, but the deeper sets were out for 6 nights before they could be lifted. Four lake trout were taken at 25 fathoms, 3 at 50 fathoms, 3 (1 siscowet) at 75 fathoms, and 1 (a siscowet) at 100 fathoms. None of these lake trout were in spawning condition. There were no chubs taken at 25 fathoms, but the chub catch was moderately large (194) at 50 fathoms. At 75 and 100 fathoms the chub catches were large (998 and 343, respectively), possibly because the nets were in the water longer. The chubs were mostly *Leucichthys reighardi* (70 percent) at 50 fathoms, and *L. kiyi* at 75 and 100 fathoms (82 percent and 87 percent, respectively). Other species were *L. hoyi* (50 fathoms) and *L. nigripinnis* (100 fathoms). Also taken in the standard gangs were lake herring (40 each at 75 and at 100 fathoms), burbot (23 at 25 fathoms, 1 at 75 fathoms, and 30 at 100 fathoms), and smelt (30 at 25 fathoms).

Trawls were towed at 20, 25, and 30 fathoms in Shelter Bay. No 0-age class lake trout were caught. Slimy sculpins, ninespine sticklebacks, and trout-perch comprised most of the catches. There were

also a few small smelt and whitefish or related species.

Complete hydrographic data were collected at a regular station in Shelter Bay. Surface water cooled rather rapidly during the cruise, and by the end of the cruise the water became vertically homothermous, or nearly so, in depths less than 30 fathoms. Surface water temperatures ranged from 6.2° C (43.1° F.) to 11.4° C (52.5° F.).

Notes: Also see *Commercial Fisheries Review*, November 1959 p. 27, and December 1959 p. 52.

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WESTERN LAKE ERIE

BIOLOGICAL RESEARCH CONTINUED:

M/V "George L." Cruise 8: Habitat conditions and fish compositions were measured by the U. S. Bureau of Commercial Fisheries research vessel George L. at the 7 "index" stations in western Lake Erie during the first two weeks of October 1959. Scales were taken from samples of commercial landings during the last 2 weeks at several ports on the south shore.

Surface-water temperatures dropped from 70° to 60° F. between October 5 and October 15. Although habitat conditions appeared normal, trawl catches of fish were low. Little food was found in the stomachs of yearling or older yellow perch. This situation was not unusual, however, since a large percentage of perch examined after August 1 had been empty. Catches of young-of-the-year yellow pike were light. Apparently they were becoming too large to be caught efficiently by trawl. Young yellow pike began to appear in trap nets in the Sandusky area in fairly large numbers during October, and by the end of the month they averaged slightly more than 10 inches long.

The samples of yellow pike, sheepshead, yellow perch, and white bass obtained from the commercial catches were adequate, but so few blue pike, cisco, and white fish were caught in October that good samples of these species could not be obtained. The combined catches of "money" fish—blue pike, yellow pike, cisco, and whitefish from Lake Erie in 1959 were the lowest on record.

Notes: Also see *Commercial Fisheries Review*, December 1959 p. 50.

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WESTERN LAKE SUPERIOR FISHERY SURVEY CONTINUED:

M/V "Siscowet" Cruise 8: A study of the abundance and distribution of spawning lake trout in western Lake Superior was conducted by the U. S. Bureau of Commercial Fisheries research vessel Siscowet during October 13-29, 1959. Gangs of large-mesh nets (5- to 6-inch mesh stretched measure) were set over spawning grounds known to have been productive in earlier years. Attached to each gang were two small-mesh nets (1½- and 2½-inch mesh) to learn the abundance of other species on the spawning grounds. Each gang consisted of approximately 3,000 feet of large-mesh nets and 600 feet of small-mesh nets. A total of 44,700 feet of large-mesh and 7,050 feet of small-mesh nets was lifted during the cruise.

The spawning grounds were as follows: Sand Island Shoal, York Island Shoal, Oak Island Shoal, Devils Island Shoal, Rocky Island Shoal, Cat Island Shoal, Manitou Island Shoal, Outer Island Shoals (two separate shoals were fished), and Bad River Reef. Two sets were made each on York, Devils, and Rocky Island Shoals, and one set was made on each of the remaining shoals.

Table 1 lists the number of spawning trout taken from each set and the number and identity of associated species taken in the small-mesh nets. All of the 20 spawning lake trout captured were males 22.6 to 33.5 inches long. Sixteen of them were tagged and released. Stomach samples were collected from the associated species for future examination in the laboratory. Stomachs examined on the vessel contained no lake trout eggs.

Spawn-taking operations on Gull Island Shoal and adjacent areas by the Wisconsin Conservation Department took place concurrently with the Siscowet's operations. A total of 194 trout were taken in this operation, only 30 of which were females; 100 fish were tagged and released by Wisconsin Conservation Department and Bureau personnel.

The water temperature during the cruise varied from 44.7° F. on Sand Island Shoal to 49.5° F. on Manitou Island Shoal.

Table 1 - Lake Trout and Other Species Taken from Gill Nets Set on Various Spawning Shoals During the Lake Trout Spawning Period

Date	Location	Depth	Lake Trout	Burbot	Lake Northern Chubs	Lake Herring	Menominee Whitefish	Smelt	Longnose Suckers
		Fathoms							
			(Number of Fish)						
Oct. 14	York Isle Shoal	4-7	-	-	5	8	23	-	25
16	Devils Isle Shoal	8-11	1	2	16	1	8	2	146
19	Cat Isle Shoal	4-8	2	-	29	1	16	1	163
19	Rocky Isle Shoal	4-8	-	3	22	2	25	18	79
20	Manitou Isle Shoal	4-29	3	-	-	9	16	13	76
20	Oak Isle Shoal	4-9	-	1	6	6	27	4	111
22	N. Outer Isle Shoal	4-9	2	-	-	59	36	-	75
22	W. Outer Isle Shoal	4-7	-	-	19	16	29	-	95
24	Devils Isle Shoal	8-9	10	-	4	25	29	-	50
24	Rocky Isle Shoal	4-13	2	-	17	18	15	-	253
28	York Isle Shoal	4-8	-	4	-	64	8	2	20
28	Sand Isle Shoal	4-9	-	-	2	42	10	-	92
29	Bad River Reef	8-9	-	10	-	4	2	12	40

Notes: Also see *Commercial Fisheries Review*, December 1959 p. 51.

Gulf of Mexico Gear

Research Program

SHRIMP-TRAWL UNDERWATER PERFORMANCE STUDIES CONTINUED:

M/V "George M. Bowers" Cruise 24:
The fifth in a series of cruises planned to study the performance of shrimp trawls was made by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel George M. Bowers between October 20-30, 1959. Due to overcast, squalls, and rough seas throughout the cruise, only 200 feet of underwater movie film was obtained.



King Crab

UNITED STATES AND JAPAN TO EXPAND KING CRAB RESEARCH IN BERING SEA:

Expansion of research on king crab in the Bering Sea was agreed upon on November 3 by Japan and the United States. The decision was made at a committee meeting of the International North Pacific Fisheries Commission which met in Vancouver, British Columbia.

The expanded research program will focus on crab-trawling in the Eastern Bering Sea. It is expected that the studies will lead to unilateral agreements between Japan and the United States for regulation and conservation of the valuable king crab resource.



Lenten Promotion

"IT'S FISH 'N' SEAFOOD TIME" WILL BE THEME FOR 1960:

The commercial fishing industry is now laying plans for its first annual industry-wide Lenten promotion. The theme for the March 2-April 17, 1960, Lenten promotion will be "It's Fish 'n' Seafood Time." Menu variety will be emphasized in advertising, publicity, and merchandising materials.

The U. S. Bureau of Commercial Fisheries will actively participate in this promotion through its consumer education program, as it has done in previous industry-wide promotions, such as "Fish 'n' Seafood Parade." Bureau materials will stress menu variety, ease of preparation, nutritional value, and other health benefits

accruing from increased use of fish and shellfish in the diet.



Maine Sardines

SARDINES OFFERED FOR STUDIES ON EFFECT OF CHOLESTEROL BUILDUP AS CAUSE OF HEART ATTACKS:

A suggestion by a nationally-known heart specialist to institute a controlled diet on 10,000 Americans to study the effects of

cholesterol buildup in the cause of heart attacks was one step nearer reality by



an offer of the of the Maine Sardine Council on November 5, 1959, to provide enough sardines to make the test possible.

A Cleveland, Ohio, doctor made the dietary study suggestion at a news conference following the close of the 32nd annual meeting of the American Heart Association.

"The only way to resolve whether or not a high cholesterol content in the blood is a contributing factor to 'coronary' heart attacks," stated the doctor, "is to place enough people on a diet specifically designed to keep the blood's concentration of cholesterol down." He indicated that at least 10,000 people would have to take part in the study to have any significance.

In a telegram to the Cleveland doctor, the Chairman of the Council endorsed the proposal and offered the services of the Maine sardine packers in donating cases of sardines to any institution or group which would undertake the study.

The Council's chairman sent this telegram to the Cleveland doctor:

"Your proposal for a controlled diet study to determine the effects of cholesterol as a key factor in atherosclerosis is one to which the Maine Sardine Council would like to lend its full cooperation.

"At present, the Council, which represents all the packers of sardines in the State of Maine, is sponsoring a study at the Massachusetts Institute of Technology to explore this area in the feeding of animals. While it is hoped that animal experiments will bring forth much

vital information on the effects of cholesterol in the blood, certainly a broad scale study such as you suggested would be of infinitely more significance.

"Studies by the University of Minnesota operating under a contract from the U. S. Bureau of Commercial Fisheries and the Massachusetts Institute of Technology and our own laboratory at Bangor, indicate that small herring, commonly referred to as sardines, are an excellent nutritive source of unsaturated fats.

"Certainly any dietary effort to lower or control the cholesterol level in the blood must include an ample amount of such food.

"The Maine Sardine Council will make available to you or any institution or group selected by you to conduct such a scientific study, free cases of Maine Sardines to include in a controlled diet program."



Marketing Surveys to Improve and Expand Markets for Fishery Products

A broad program of market research by contractors under the supervision of the U. S. Bureau of Commercial Fisheries made possible by funds provided by the Saltonstall-Kennedy Act of 1954 includes the following: (1) Motivation Study on Use of Canned Salmon, Tuna, and Sardines by Homemakers; (2) Nationwide Consumer Panel Survey on Canned Fish Consumer Purchases, October 1958-September 1959; and (3) Geographic Distribution of Canned Tuna, Salmon, and Sardines.

Motivation Study on Use or Nonuse of Canned Fish by Homemakers: The promotional problem for canned salmon is not so much one of increasing usage among consumers already using the product, but the persuasion of those who do not use salmon to become users. The problem is the very opposite with canned tuna; the promotional effort must be directed toward increasing consumption among consumers already using tuna,

and particularly among those using the product only occasionally.



These are some of the conclusions contained in a study being completed under a contract with the Bureau. The study directed toward learning what motivates homemakers to use or not to use canned salmon, tuna, and sardines surveyed attitudes in three urban areas, namely, Boston, Mass., Detroit, Mich., and Birmingham, Ala., and in one rural area, Orangeburg County, S. C.

Consumer Panel Survey on Canned Fish Purchases, October 1958-September 1959: Another phase of the Bureau's broad marketing research program directed toward improving and expanding markets for fishery products is a nationwide consumer panel survey of canned fish consumer purchases during the period October 1958 to September 1959.

Report of household consumer purchases of canned tuna, salmon, and sardines have been released to the fishery trade monthly as received from the contractor.

Recently, a report summarizing data on household consumer purchases during the first six months of the study, October 1958-March 1959, was published. This report also covered family characteristics of canned fish consumer purchasers. A full twelve-months report will be made available after completion of this study.

Geographic Distribution of Canned Tuna, Salmon, and Sardines: A first phase report of the U. S. Bureau of Census study of geographic distribution of canned tuna, salmon, and sardines has been received.

This report covers shipments by packers during the six months ending

December 31, 1958. The U. S. Bureau of Census is now preparing a final report covering packer shipments during the twelve months ending June 30, 1959.

This information should be of considerable value to the canned fish segment of the domestic commercial fishing industry in the planning of market operations and to the U. S. Bureau of Commercial Fisheries in planning its consumer education and market development programs.

Note: Also see Commercial Fisheries Review, August 1959 p. 28, June 1959 p. 32, November 1958 p. 34.



National Fish Week

"FISH FOR HEALTH" MESSAGE BROADCAST BY ASSISTANT SECRETARY:

Assistant Secretary of the Interior for Fish and Wildlife Ross L. Leffler was interviewed by Don McNeil on his "Breakfast Club Show" before a live



Mr. Leffler being interviewed by Don McNeil on his "Breakfast Club Show."

audience on October 13, 1959. The nationwide broadcast of the transcribed show on October 14 reached some 30 million people through the 436 ABC network affiliates in the United States and Canada and over the Armed Forces Radio Network.

Secretary Leffler's presentation had as its theme "fish for health." This was the first announcement of a major "nu-

tritional breakthrough" which indicates the value of fishery products in lowering cholesterol levels in the blood.

* * * * *

"FISH 'N' SEA FOOD PARADE" PARTICIPATION BY U. S. BUREAU OF COMMERCIAL FISHERIES:

The fifth annual industry-wide "Fish 'n' Sea Food Parade" promotion, held October 19-25, 1959, is now history. Indications are that this was the most successful such promotion to date.



The U. S. Bureau of Commercial Fisheries again actively participated through its consumer education program, which is designed to promote the greater use of domestically-produced fishery products. As its contribution to this promotional effort, the Bureau distributed 75,000 single-sheet promotional leaflets to public and private schools participating in the National School Lunch Program; 25,000 single-sheet promotional leaflets to restaurants throughout the United States; 20,000 single-sheet promotional leaflets to public and private institutions throughout the country; 15,000 38-page fact sheets to newspaper food editors and other food publicists throughout the United States; 3,800 black-and-white food photographs to food editors; television slides, drop cards, and scripts to virtually every television station in the country; public service radio recordings and scripts to all radio stations in the United States; and 300 each of 60-second, 20-second, and 8-second animated public service television shorts to television stations throughout the country.

In addition, Bureau home economists and marketing specialists appeared on

about 60 radio and television stations throughout the United States during Fish 'n' Seafood Parade. Stressed were the nutritional and health values, ease of preparation, and variety of fishery products. In a number of instances, appearances by industry people on radio and television shows were also arranged.

"Fish 'n' Seafood Parade 1959" is an excellent example of a cooperative industry-Government effort.



North Atlantic Fisheries Exploration and Gear Research

ELECTRICAL TRAWL-FISHING TESTS OBSERVED WITH UNDERWATER TELEVISION:

M/V "Cape May": Tests of electrical trawl-fishing by the commercial research vessel Cape May were observed by U. S. Bureau of Commercial Fisheries gear specialists utilizing Bureau underwater television equipment. The tests were made on the southern part of Stellwagen Bank in 11-15 fathoms from September 21 to October 6, 1959.

The underwater television camera was suspended on a chain bridle from the top square of a modified No. 41 trawl looking forward toward the mouth of the net.

The positive electrode was attached to the headrope of the trawl and was hung directly off the bottom in view of the television camera. The negative electrode was trailed on a cable into the cod end. The electronic apparatus of high-power output aboard the M/V Cape May was connected by a heavy rubber-jacketed two-conductor cable to the two V-shaped copper pipe electrodes. Basically, the electronic system charges and discharges a large bank of capacitors through ignitrons at the desired pulse amplitude, width, and frequency.

Because of limitations of visibility, due to turbid water and the narrow angle of camera view, it was not possible to observe the total area in which the electric field was effective. Only the area

of very strong fields close to the positive electrode was seen. The electronic pulsing unit was switched on when fish appeared on the television monitor screen, and all of the species within the camera's field were stunned immediately. While fishing at standard trawl speeds, observations were made on the reaction of various species of fish, including yellowtail flounder (Limanda ferruginea), skate (Raja sp.), and dogfish (Squalus acanthias). The yellowtail flounder and the skate consistently curled up under the influence of the electrical field; flounder from head to tail, and the skate from wing-tip to wing-tip.

At one period during the operation, fish were not in evidence on the monitor screen. However, when the electronic unit was switched on, stunned fish (hake) were seen drifting by the camera in an inverted position into the mouth of the net. These fish continued to enter the net as long as the electric unit was in operation.

A photographic record of fish behavior was obtained from the television monitor screen.



North Atlantic Fishery Investigations

SURVEY OF STOCKS OF JUVENILE HADDOCK ON GEORGES BANK AND VICINITY COMPLETED:

M/V "Delaware" Cruises 12 and 13: Two cruises were made (September 23-October 27, 1959) by the U. S. Bureau of Commercial Fisheries research and exploratory fishing vessel Delaware to survey young-of-the-year haddock and older haddock populations on Georges Bank, the Gulf of Maine, Browns Bank, and the area between Georges Bank and Southern Long Island, N. Y.

The annual census, made by biologists from the Bureau's Woods Hole Biological Laboratory showed that the 1959 year-class, spawned mostly in February and March this year, does not appear to be a particularly strong one. Juvenile haddock were much less abundant on the eastern part of Georges Bank than they were in 1958, about the same as in 1958 on Browns Bank, but somewhat more abundant in the South Channel area. On

the average the 1959 haddock year-class does not appear to be as strong as the one produced in 1958. Fish of the 1959 year-class will be large enough to be taken by commercial boats with legal, large-mesh nets late in the summer and fall of 1961.



The Service's research vessel Delaware.

The 1958 year-class, due to enter the fishery in the summer and fall of 1960, was found to be abundant during the 1958 census cruises. A reassessment of the strength of this year-class will be made on the basis of the number of one-year old fish in the samples collected in September-October 1959 cruises. When an analysis of samples has been completed an announcement will be made regarding a revised estimate of the strength of the 1958 year-class.

The success of this 1958 year-class is particularly important to the New England groundfish industry, currently finding haddock at its lowest level of abundance in many years. Since about 1948 haddock populations on Georges Bank consisted of strong broods in even-numbered years and weaker ones in odd numbered years, but this sequence was broken when 1956 turned out to be a poor year for the survival of young fish. Since the intensive fishery depends on frequent successful broods to keep up the supply of fish on the banks, the relatively weak 1955, 1956, and 1957 year-classes have

considerably diminished the number of fish available to the New England trawlers.

Fortunately the abundance of cod has increased somewhat as the abundance of haddock has decreased, and Bureau biologists state that this species should be relatively abundant for another year or longer.



North Pacific Exploratory

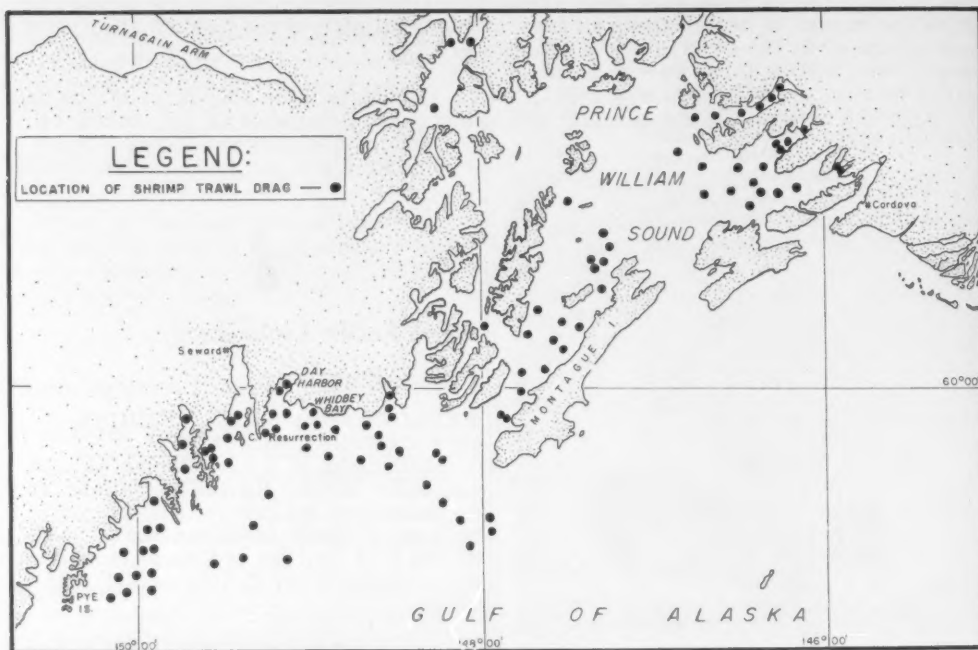
Fishery Program

EXPLORATORY SHRIMP FISHING OFF CENTRAL ALASKA:

M/V "John N. Cobb" Cruise 44: Exploratory shrimp fishing operations were conducted off the central Alaska coast between October 14-November 13, 1959, by the U. S. Bureau of Commercial Fisheries' exploratory fishing vessel John N. Cobb.

A total of 101 exploratory drags was made in the area from east of the Pyle Islands to and including Prince William Sound at various depths between 20 and 233 fathoms. Except when snags were encountered, drags were of 30 minutes duration. All drags were with a 40-foot, flat, Gulf-of-Mexico-type shrimp trawl on a 5 feet x 2½ feet 150-pound doors using a single warp and a 20-fathom bridle.

Pink shrimp (*Pandalus borealis*) and sidestripe shrimp (*Pandalopsis dispar*) were found in all waters fished at depths deeper than 40 fathoms. The largest catches during the explorations were made during two drags outside of Day Harbor: one drag, 1½ miles north of Resurrection Cape, in 68-84 fathoms, yielded 330 pounds (heads on) of mixed pink and sidestripe shrimp; and another drag, 8 miles south southeast of Whidbey Bay, in 55-59 fathoms, also resulted in a catch of 330 pounds of mixed shrimp. Poor bottom conditions in both areas limited the length of drags. Twelve other drags in various localities produced from 100 to 300 pounds of shrimp each, and the remaining 87 drags yielded less than 100 pounds each.



'M/V John N. Cobb Cruise No. 44 (Oct. -Nov. 1959).

A total of 600 pounds of marketable Pacific ocean perch (*Sebastes alutus*) was taken in a drag 16 miles east of the Pye Islands in 90-102 fathoms. The majority of the incidental fish catches, however, were predominantly nonmarketable fish such as turbot, pollock, eulachon, and sculpins, and miscellaneous invertebrates, including various starfish, sea anemones, and tanner crabs. (See map above.)



Oysters

EFFECT OF COPPER BARRIERS ON OYSTER MEATS STUDIED:

The presence of copper in the experimental oyster drill barrier used in Chincoteague Bay, Va., to surround oyster beds poses a problem of possible increased copper in the oyster meats.

Many samples of oysters have been collected by shellfish biologists of the

U. S. Bureau of Commercial Fisheries at graduated distances from the barrier, and the meats examined. No excessive accumulation of the metal, whether they came from inside or directly outside the barrier-enclosed large beds, was revealed. However, in very small enclosures and in laboratory aquaria, the impounded oysters exposed to copper appeared to be greener in color than the controls. Precise analysis of the meats of these latter oysters will be made for copper content to evaluate the visual tests first used to check copper intake.

PRODUCTION ON ATLANTIC COAST IN 1959/60 MAY HIT NEW LOW:

The Atlantic Coast 1959/60 oyster season will probably go into the record as the year of lowest production of oysters. The Atlantic Coast industry, north of Chesapeake Bay, has reached a new low. Practically no oysters will be produced from the entire Delaware Bay system and the Long Island yield will be far

below its 1950/51 level. Even the Chesapeake oysters will be less abundant than they were in 1958/59 and far below five years ago.

A heavy summer death rate in the Lower Chesapeake Bay in Virginia is the major factor in this decline in yield. Coupled with a limited supply of oysters on the public beds in Maryland, the prospects are gloomy indeed.

This scarcity of oysters has resulted in high prices for all shell stock and in rapid price increases for shucked standards, selects, and extra selects. The prices for these grades are the highest on record. Some packers and repackers predict even further increases, although some report buyer resistance.

While this difficult picture characterizes the Atlantic Coast, the Gulf and Pacific Coast oyster growers and packers indicate a somewhat more stable production equal if not in excess of 1958/59.

This could well mean that the total financial return this season will be as high as 1958/59, even though the overall production will drop.

UNITED STATES OYSTER PRODUCTION, 1958 WITH COMPARISONS:

Over a period of nine years (1950-1958), United States production of oysters has declined steadily. Production

State	1958	1957	1954	1950
	(1,000 Lbs.)			
Maine	4	6	6	-
Massachusetts . .	113	152	174	228
Rhode Island . .	3	3	112	922
Connecticut . .	156	244	443	3,577
New York	1,057	1,067	1,708	8,787
New Jersey . . .	829	2,720	7,329	7,242
Delaware	2,410	4,194	4,340	2,141
Maryland	12,026	14,144	20,363	14,406
Virginia	25,503	20,090	21,224	15,547
North Carolina .	1,041	1,086	1,009	1,322
South Carolina .	1,437	1,845	2,562	1,374
Georgia	143	112	217	308
Florida	825	736	690	903
Alabama	458	1,291	739	2,070
Mississippi . . .	579	863	977	508
Louisiana	8,265	10,490	8,361	8,715
Texas	311	953	699	125
California	1,159	1,359	74	39
Oregon	508	429	436	976
Washington . . .	9,570	9,874	10,459	7,225
Total	66,397	71,658	81,922	76,415

of oysters during the 1950-58 period has been relatively stable in the east coast areas south of Delaware, the Gulf of Mexico area, and on the West Coast, but the drop has been very sharp for the oyster-producing areas located in Delaware Bay; Great South Bay, Long Island, N. Y.; Long Island Sound; Narragansett Bay in Rhode Island; and Buzzards Bay in Massachusetts. Production of oysters in northern California increased sharply following the large-scale planting of Japanese oyster seed in 1955-56.



Salmon

ALASKA'S 1959 SALMON PACK LOW, BUT ESCAPEMENT FAIR:

As of October 11, 1959, Alaska's salmon pack amounted to only 1,770,795 cases (48 1-lb. cans) as compared with a total of 2,989,290 cases packed by October 1, 1958. Alaska's pack of salmon in 1959 was the lowest since 1900. There were slight increases in 1959 in the Alaska pack of sockeye or red salmon and king salmon, but sharp declines in the pack of pink salmon (637,714 cases as compared with 1,583,198 cases) and chum salmon (410,758 cases as compared with 758,891 cases). In Southeastern Alaska there was a slight gain over the cycle year (1957) in pink salmon, but a disastrous decline in the pack of chums. In Central Alaska both the pink and chum salmon packs were down drastically, particularly pink salmon (only 165,681 cases in 1959 as compared to 809,937 cases in 1958).

The severe drop in the pack of pink salmon was not reflected in the escapement. The salmon escapement to the salmon streams although far from excellent, was relatively good as compared with the pack.

BRISTOL BAY RED SALMON RUN PREDICTION FOR 1960:

Representatives of the Alaska Department of Fish and Game, Fisheries Research Institute of the University of Washington, and the U. S. Bureau of Commercial Fisheries met in Juneau

November 11, 1959, to consider the possible size of the red salmon run in Bristol Bay in 1960. Background information which was available to the three agencies and "pooled" for the study included the number and age of red salmon which had spawned in past years, the abundance of young salmon which had migrated to the ocean in recent years, and the abundance of immature red salmon in the ocean in recent years. As a result of the varying indications derived from these data two estimates were made. The first was based on the average relationship between number of spawners and the resulting run, and the second was based on the abundance of young salmon migrating to sea combined with the abundance of immature red salmon in the ocean. The first method resulted in the prediction of a run of 18 million red salmon in Bristol Bay in 1960 and the second method of a run of 35 million red salmon. The actual 1960 run can be expected to deviate considerably from either prediction, although the three agencies believe that the most probable total run will be between these two estimates.

Most of the difference in the two predictions lies in the estimates for the Kvichak River. In 1956 there was an unusually large number of spawning red salmon in this system and the Bristol Bay run in 1960 will depend primarily on the success of this spawning and the proportion that returns in 1960 as 4-year-old fish.

The fisheries agencies emphasized that the estimates will be effected by the size of the Japanese high-seas catch in 1960. The run of red salmon in Bristol Bay will be decreased in proportion to the take of red salmon on the high seas by Japanese fishermen.



South Atlantic Exploratory Fishery Program

EXPLORATORY TRAWLING SURVEY OFF SOUTH CAROLINA AND GEORGIA COASTS:

M/V "Silver Bay" Cruise 19: The second in a series of cruises to assess the

commercial fishing potential off the South Atlantic Coast was made by U. S. Bureau of Commercial Fisheries chartered fishing vessel *Silver Bay* between October 14-29, 1959. During the cruise 70 trawl tows were made in 5-50 fathoms between Little River Inlet, S. C., and Brunswick, Ga.

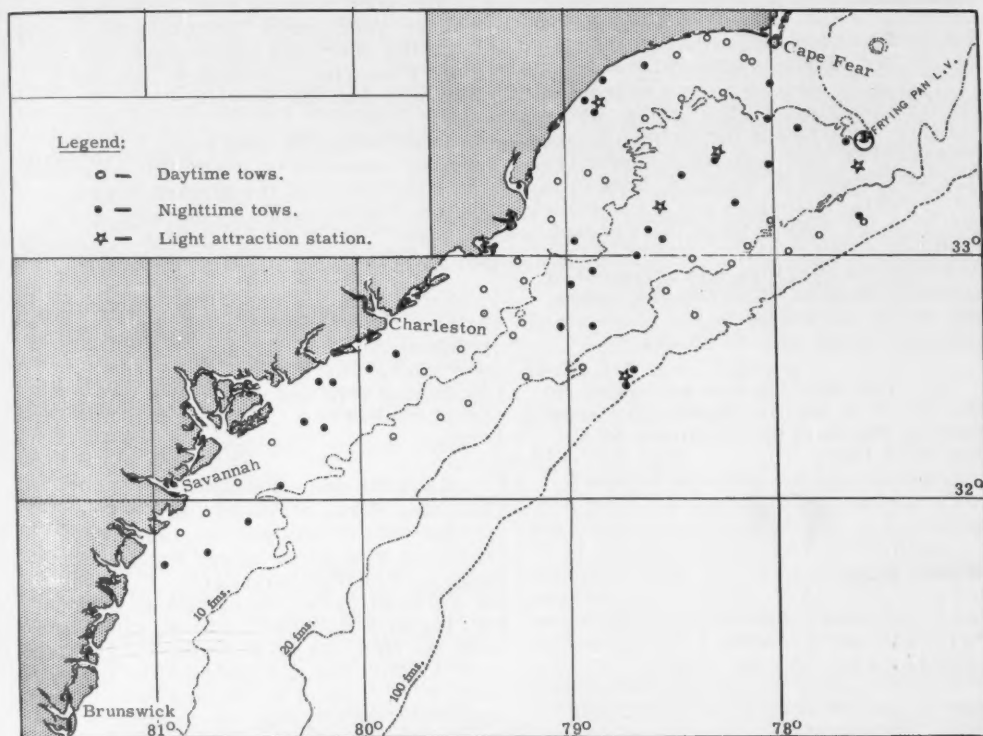
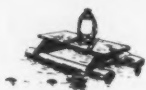
Trawling gear consisted of 60/80-foot (60-foot headrope and 80-foot footrope) and 64/84-foot two-seam shrimp trawls equipped with 6-inch rollers and 54/74-foot fish trawls equipped with 24-inch rollers. All trawls were fished with tickler chains.

Shrimp: Most of the fishing was conducted inside of the 20-fathom curve (60 drags), along the outer edge and adjacent to known shrimping grounds. Thirty-six drags inside of 10 fathoms yielded white shrimp (*Penaeus setiferus*) in 9 drags, brown shrimp (*P. aztecus*) in 15 drags, and pink shrimp (*P. duorarum*) in 12 drags. All three species were present in the same drag on two occasions. The highest catch rate for a combination of these shrimp species was 17 pounds (heads-on) per hour. Twenty-four drags between 10 and 20 fathoms caught small numbers of pink shrimp in 6 drags and a single brown shrimp. Average sizes for whites, browns, and pink shrimp ran 21-25 count (heads-off). Rock shrimp (*Sicyonia*) were most frequently encountered between 10 and 20 fathoms; however, the best catch (10 pounds) was made in 50 fathoms.

Fish: Fish catches were small over the entire area. Porgy or scup, croaker, and spot made up the bulk of the catch which generally ran below 100 pounds an hour, although a one-hour drag in 19-21 fathoms caught 1,750 pounds of porgy, vermillion snapper, and several miscellaneous species.

A few red snapper and grouper were taken in two of the six drags between 40 and 50 fathoms. Catches of up to 30 pounds of flounder (fluke) were also made in this range.

Biological material representative of the area was collected and preserved for future study by a member of the staff of the Bureau's Biological Laboratory, Brunswick, Ga.

M/V Silver Bay Cruise 19 (October 14-29, 1959).

Spotted Sea Trout

TAGGING TO DETERMINE GROWTH RATES AND MIGRATIONS:

A study to determine growth rates and migrations of spotted sea trout (*Cynoscion nebulosus*) off the west coast of Florida by tagging is being conducted by The Marine Laboratory of the University of Miami. Returns indicate that the tagged spotted sea trout do not travel far from the point of release.

A total of 3,759 sea trout have been tagged, of which 220 tags have been returned from fish released in the Fort Myers, Cedar Key, and Apalachicola,

Fla., areas. All but 4 of the tagged fish were caught within 30 miles of the tagging site. The longest migration of a single fish was from Apalachicola, Fla., to Grand Island, La., or about 265 miles west from the tagging area.

Two types of tags are being used in the experiments. One is an internal small green oval plastic tag that is inserted in the body cavity of the fish and is found when the fish is cleaned. The second type is a yellow plastic tube about two inches in length attached to an internal tag. The plastic tube protrudes from the body of the fish to aid in detection.



Standards

TWO HEARINGS HELD ON FROZEN SALMON STEAK STANDARDS:

Two open meetings were scheduled for final hearings on the United States Standards for Grade for Frozen Salmon Steaks. The meetings were conducted by technologists of the U. S. Bureau of Commercial Fisheries prior to promulgation of the Standards in the Federal Register early in 1960. An invitation to attend the hearings was extended to packers, brokers, distributors, users, and others interested in the grade standards for frozen salmon steaks.

The first meeting was scheduled November 23 at Seattle, Wash. The second meeting was held on November 30 at New York City.



Striped Bass

GOOD FISHING PREDICTED FOR POTOMAC RIVER AND CHESAPEAKE BAY IN 1960:

In 1960 fishing for striped bass (rockfish) in the Potomac River and Chesapeake Bay promises to equal and perhaps exceed the record-breaking 1958 harvest, according to a prediction made by State and Federal biologists.

A biologist of the Maryland Chesapeake Biological Laboratory reported that a whopping crop of Potomac River 1½-year-olds should reach the legal 12-inch minimum size by April or May 1960. His observations have been confirmed by other observers.

Support for the bonanza prediction came in the last two weeks when the biologists and his assistants, looking for fish to tag, noted an unusually large proportion of 10- and 11-inch striped bass in Potomac River pound nets.

Scientists had seen indications of a very large crop during 1958/59 winter-trawling and tagging operations, but felt more evidence was needed before making a prediction. A creel census during the summer helped when it revealed anglers were plagued with undersized fish.

The good news is a fringe benefit of a three-year project involving scientists from the Maryland Laboratory, the Virginia Fisheries Laboratory, and the U. S. Fish and Wildlife Service.

Completing its first year, the cooperative research is attempting to sketch the life history of the striped bass in a typical Chesapeake Bay estuary, and to discover how fast this species are caught, and by whom.

Biologists are checking Potomac River fish concentration areas with trawls, tracking fish by releasing tagged fish, and noting where they are caught, and collecting size and abundance data by creel census and commercial catch records.

Since the winter of 1958/59, 3,600 Potomac River striped bass have been tagged with oblong yellow plastic tags fastened with nylon thread through the hind part of the fish's back. Each tag is worth \$1 to the fisherman who mails the tag plus details on where, when, and how the fish was taken to the U. S. Fish and Wildlife Service Laboratory in Beaufort, N. C. About 1,000 tags have been returned, leaving tags worth about \$2,600 on fish yet to be caught.

Returns to date suggest that while some Potomac River striped bass venture far afield, most tend to stay put in home waters.

The 1959 winter-trawling program, which lasted three weeks, upset the previous suspicion that striped bass concentrate only in deep holes in cold weather. Instead, scientists netted fish spread widely over a 35-mile stretch of river, at depths of 30 to 100 feet. The fish were quite active in spite of water temperatures from 34° to 37° F.

The 1959 summer creel census yielded useful data on the sports catch although it was primarily intended to test data-gathering methods. A full-scale census will be undertaken in the summer and fall of 1960.

The Maryland Laboratory director said the Potomac River project is an example of what can be accomplished

through interstate and interagency co-operation. Without such, a really full-scale study of the striped bass fishery would be years in the future. "This program is the first really adequate attempt to provide fishery management with worthwhile tools needed badly," the Director stated.

He added, "If the striped bass' tendency to stay in home waters, such as the Potomac River, is verified, a possible outcome could be that agencies could manage the River as a unit independent from the Chesapeake Bay fishery. Future research in the larger bay will benefit considerably from experience gained in the Potomac River. The two bodies of water have a remarkable resemblance."



Tuna

PURSE SEINING FOR TUNA OFF MASSACHUSETTS IN 1959 SUCCESSFUL:

In 1951, a New England bluefin-tuna project was initiated by what is now the U. S. Bureau of Commercial Fisheries to determine the feasibility of establishing a commercial tuna fishing industry in the New England region. In that and succeeding years, a number of types of gear were used in extensive areas off that area's coast. By 1954 it had been established that bluefin could be taken in commercial quantities, at least during the summer months, with purse-seine gear in inshore waters.

The Bureau, having thus established the availability of the tuna and having found an efficient gear with which to capture them, made an offer to loan any commercial fisherman a seine net, accessory gear, and technical advice if that fisherman would convert his vessel to tuna seining and make available to the public any pertinent information. There were no takers. The resource lay untapped.

But in 1958, a Provincetown, Mass., fisherman with a small otter trawler became interested in the project and accepted the Bureau's 1954 offer. During the first season of operation, catches of sufficient size were made to indicate the

commercial feasibility of this fishery. Between July 24 and October 4, 1958, 38 sets were made and a total of 179 short tons of bluefin tuna was landed.

The vessel spent the winter of 1958/59 trawling and recommenced the cooperative tuna-seining operation on August 2, 1959, again using the Bureau-owned equipment. With a crew of nine men and in 21 trips, the small vessel had taken a total of 696 tons of tuna by the end of the season on September 26--in an inshore area in the vicinity of Provincetown, Mass.



United States Fishing

Fleet ^{1/} Additions

AUGUST 1959:

A total of 36 vessels of 5 net tons and over were issued first documents as fishing craft during August 1959--a decrease of 22 vessels compared with the same month in 1958. The Gulf area led with 14 vessels, while the South Atlantic area was second with 8 vessels, followed by the Pacific area with 7 vessels.

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft by Areas, August 1959

Area	August		Jan. - Aug.		Total
	1959	1958	1959	1958	
	(Number)				
New England . . .	1	-	11	10	13
Middle Atlantic . .	-	2	6	11	13
Chesapeake . . .	4	10	60	65	99
South Atlantic . .	8	18	67	94	135
Gulf	14	20	102	198	270
Pacific	7	5	77	89	112
Great Lakes . . .	-	-	5	5	10
Alaska	2	3	30	27	31
Virgin Islands . .	-	-	-	1	1
Total	36	58	358	500	684

Note: Vessels have been assigned to the various areas on the basis of their home ports.

During the first eight months of 1959, a total of 358 vessels were issued first

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft by Tonnage, August 1959

Net Tons	Number
5 to 9	16
10 to 19	7
20 to 29	7
30 to 39	1
40 to 49	5
Total	36

documents as fishing craft--142 below the same period of 1958. Most of the decline occurred in the Gulf area where 96 fewer ves-

sels were documented in 1959 than in 1958.

^{1/}Includes both commercial and sport fishing craft.

* * * * *

SEPTEMBER 1959:

A total of 41 vessels of 5 net tons and over were issued first documents as fishing craft during September 1959--a decrease of 24 vessels compared with the same month in 1958. The Gulf area continued to lead with 15 vessels. The Chesapeake area was second with 9 vessels, followed by the Pacific area with 7 vessels.

Table 1 - U. S. Vessels Issued First Documents as Fishing Craft by Areas, September 1959

Area	September		Jan.-Sept.		Total
	1959	1958	1959	1958	
	(Number)				
New England	2	1	13	11	13
Middle Atlantic	4	-	10	11	13
Chesapeake	9	4	69	69	99
South Atlantic	2	16	69	110	135
Gulf	15	33	117	231	270
Pacific	7	7	84	96	112
Great Lakes	1	1	6	6	10
Alaska	1	3	31	30	31
Virgin Islands	-	-	-	1	1
Total	41	65	399	565	684

Note: Vessels have been assigned to the various areas on the basis of their home ports.

During the first nine months of 1959 a total of 399 vessels were issued first documents as fishing craft--166 below the same period of 1958. Vessels receiving first documents from the Gulf States area dropped 114 below the 1958 nine-month period.

Table 2 - U. S. Vessels Issued First Documents as Fishing Craft by Tonnage, September 1959

Net Tons	Number
5 to 9	21
10 to 19	10
20 to 29	4
30 to 39	2
40 to 49	2
50 to 59	1
160 to 169	1
Total	41

United States Fishery Landings, January-September 1959

Landings of fish and shellfish in the United States during the first 9 months of 1959 totaled over 3.6 billion pounds--about 11 percent higher than for the same period of 1958.

Menhaden landings amounted to 1,851 million pounds during the first 9 months of 1959--a gain of 534 million pounds compared with the same period the preceding year. Landings of jack and Pacific mackerel increased along the Pacific Coast by 7 and 10 million pounds, respectively, during the nine-months period. In the South Atlantic and Gulf States, shrimp landings exceeded those of the previous year by 9 million pounds. In New England, whiting landings also recorded a rise of 9 million pounds.

During the first 9 months of 1959, landings of haddock and ocean perch in New England were down 8 and 13 million pounds, respectively. There was also a 16-million-pound decline in the yield of industrial fish in this area.

Table 1 - United States Fishery Landings of Certain Species for Periods Shown, 1959 and 1958 1/

Species	Period	1959	1958	Total 1958
..... (1,000 lbs.)				
Anchovies, Calif.	9 mos.	2,200	6,322	8,148
Cod:				
Maine	8 mos.	2,300	2,400	2,735
Boston	9 "	14,300	13,139	16,183
Gloucester	9 "	2,400	2,321	3,189
Total cod		19,000	17,860	22,107
Haddock:				
Maine	8 mos.	2,400	2,973	3,997
Boston	9 "	60,100	70,391	81,509
Gloucester	9 "	10,800	8,368	9,798
Total haddock		73,300	81,732	95,304
Halibut 2/:				
Wash. and Oreg.	9 mos.	17,100	15,411	16,200
Alaska	9 "	21,400	19,888	19,888
Total halibut		38,500	35,299	36,088
Herring:				
Maine	8 mos.	83,200	106,474	170,977
Alaska (season over)	9 "	110,000	88,801	88,801
Industrial fish, Maine & Mass. 3/	9 mos.	88,700	105,000	108,869
Mackerel, Calif.:				
Jack	9 mos.	17,800	10,918	21,698
Pacific	9 "	23,500	13,504	24,624
Menhaden	9 mos.	1,851,100	1,316,925	1,544,700
Ocean perch:				
Maine	8 mos.	51,100	52,494	71,068
Boston	9 "	2,200	1,826	2,625
Gloucester	9 "	50,300	62,529	74,951
Total ocean perch		103,600	116,849	148,644
Salmon:				
Wash. 4/	9 mos.	33,500	44,906	54,363
Oreg. 4/	8 "	4,300	6,701	8,179
Alaska	to Oct. 11	141,700	239,143	241,255
Sardines, Pacific	10 mos.	38,900	141,500	207,429
Scallops, sea, New Bedford (meats)	9 mos.	14,300	12,014	15,253
Shrimp (heads-on):				
South Atl. & Gulf.	9 mos.	88,700	79,577	195,808
Washington	9 "	2,700	6,306	6,730
Oregon	8 "	2,400	1,392	1,523
Alaska	8 "	9,500	4,856	7,862
Squid, Calif.	9 mos.	15,700	4,862	4,864
Tuna, Calif.	to Oct. 9	236,400	269,004	307,378
Whiting:				
Maine	8 mos.	21,900	22,600	23,577
Boston	9 "	600	335	596
Gloucester	9 "	53,800	44,578	58,927
Total whiting		76,300	67,513	83,100
Total of all above items		3,075,300	2,777,458	3,403,704
Others (not listed)		538,800	542,366	1,312,296
Grand total		3,614,100	3,319,824	4,716,000
1/Preliminary.				
2/Dressed weight.				
3/Excluding menhaden.				
4/Landed weight.				

Table 2 - United States Fishery Landings by States
for Periods Shown, 1959 and 1958 1/

Area	Period	1959	1958	Total 1958
		..... (1,000 lbs.)		
Maine	8 mos.	186,300	214,045	316,955
Massachusetts 2/:				
Boston	9 mos.	89,000	100,334	123,764
Gloucester	9 "	197,400	185,102	230,218
New Bedford	9 "	89,800	89,103	111,669
Provincetown ..	9 "	21,500	17,957	25,754
Total Mass. ..		397,700	392,496	491,405
Rhode Island 3/...	8 mos.	84,900	70,562	103,452
New York 3/...	8 "	26,000	28,176	42,063
New Jersey 3/...	9 "	42,700	37,953	50,933
North Carolina 3/...	9 "	45,400	45,450	54,866
South Carolina 3/...	9 "	11,800	11,586	15,359
Georgia	8 "	11,900	11,612	20,066
Florida 3/...	8 "	85,300	95,073	158,724
Alabama	7 "	7,700	5,395	10,343
Mississippi 3/...	7 "	10,600	8,002	82,476
Louisiana 3/...	5 "	24,600	28,800	75,237
Texas 3/...	8 "	40,700	35,463	80,478
Ohio (Mar.-Aug.) ..	8 "	14,600	13,798	19,145
Oregon 2/...	8 "	36,000	44,112	59,467
Washington 2/...	9 "	113,000	122,887	164,987
California:				
Certain species 4/	9 mos.	334,500	446,110	581,199
Other	6 "	42,100	42,524	82,709
Total Calif. ...		376,600	488,634	663,908
Rhode Island, Middle Atlantic, Chesapeake, South Atlantic, and Gulf States (menhaden only)	9 mos.	1,815,700	1,313,092	1,540,867
Alaska:				
Halibut 5/...	9 mos.	21,400	19,888	19,888
Herring (season over)	9 "	110,000	88,801	88,801
Salmon	to Oct. 11	141,700	239,143	241,255
Shrimp	8 mos.	9,500	4,856	7,862
Total of all above items		3,614,100	3,319,824	4,308,537
Others (not listed)		6/	6/	407,463
Grand total		6/	6/	4,716,000

1/ Preliminary.

2/ Landed weight.

3/ Excluding menhaden.

4/ Includes catch of anchovies, jack and Pacific mackerel, Pacific sardines, squid, and tuna. Data on tuna are for the season to October; data on Pacific sardines are for a ten-months period.

5/ Dressed weight.

6/ Data not available.

Note: Data principally represent weight of fish and shellfish as landed except for mollusks which represent the weight of meats only.

Maine herring landings through the end of August amounted to 83 million pounds--down 23 million pounds as compared with the same period in 1958. Landings of Pacific sardines through the end of October lagged nearly 103 million pounds behind the same period the previous year. California landings of tuna also decreased--down 33 million pounds. Total landings of Alaska salmon dropped from 239 million pounds in 1958 to 142 million pounds--the smallest catch since 1900.

Landings of menhaden, Alaska herring, and industrial fish in Maine and Massachusetts used in the manufacture of meal and oil comprised 57 percent of the production during the first 9 months of 1959. This was 11 percent more than for the same period of 1958.



U. S. Foreign Trade

EDIBLE FISHERY PRODUCTS,
SEPTEMBER 1959:

Imports of edible fresh, frozen, and processed fish and shellfish into the United States during September 1959 increased by 11.2 percent in quantity and 13.7 percent in value as compared with August 1959. The increase was due primarily to higher imports of groundfish fillets (up 5.9 million pounds), and frozen tuna other than albacore (up 2.7 million pounds), and to a lesser degree, an increase in the imports of canned salmon and frozen shrimp. The increase was partly offset by a drop in the imports of fresh and frozen salmon (down 0.8 million pounds) and canned tuna in brine (down 0.4 million pounds).

United States Foreign Trade in Edible Fishery Products, September 1959 with Comparisons					
Item	Quantity		Value		
	September 1959	1958	September 1959	1958	1958
	(Millions of Lbs.)		(Millions of \$)		
Imports:					
Fish & shellfish: Fresh, frozen, & processed 1/	95.5	92.7	956.8	25.7	278.4
Exports:					
Fish & shellfish: Processed only 1/ (excluding fresh & frozen)	7.7	3.3	41.2	3.8	15.6

1/ Includes pastes, sauces, clam chowder and juice, and other specialties.

Compared with September 1958, the imports in September 1959 were up by 3.1 percent in quantity and 0.4 percent in value due to higher imports of canned salmon (up 2.1 million pounds) and fillets other than groundfish (up 1.6 million pounds).

United States exports of processed fish and shellfish in September 1959 were higher by 68.0 percent in quantity and 137.5 percent in value as compared with August 1959. Compared with the same month in 1958, the exports in September 1959 were higher by 129.1 percent in quantity and 192.3 percent in value due to sharply higher exports of relatively high-value

canned salmon and a 112-percent increase in exports of California sardines.

GROUNDFISH FILLET IMPORTS, OCTOBER 1959:

During October 1959, imports of groundfish and ocean perch, classified as fillets, into the United States totaled 11.5 million pounds. Canada was the leading country with 7.9 million pounds or 69 percent of the October 1959 total. Iceland was second with 3.2 million pounds. Imports from five other countries made up the remaining 376,000 pounds.

The sharp decline in October 1959 of imports of the above species classified as fillets was due to a recent United States Customs Court ruling which held that fish fillet blocks imported in bulk (15 pounds and over) are dutiable at one cent a pound under Tariff paragraph 720 (b) rather than at $1\frac{7}{8}$ cents or $2\frac{1}{2}$ cents a pound under Tariff paragraph 717 (b). This ruling became effective on September 15, 1959. Thus data on imports of groundfish fillets since that date are not comparable with previous data.

During the first ten months of 1959, imports of groundfish and ocean perch, classified as fillets, but not including fish blocks since September 15, into the United States totaled 137.6 million pounds. Canada, with 70.7 million pounds accounted for 51 percent of the 1959 ten-months total. Imports from Iceland (36.7 million pounds) represented 27 percent of the total, while Denmark followed with 14.0 million pounds or 10 percent, and Norway with 10.3 million pounds or 7 percent. Seven other countries made up the remaining 5.9 million pounds or 5 percent.

Note: See Chart 7 in this issue.

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

The quantity of tuna canned in brine which may be imported into the United States during the calendar year 1959 at the $12\frac{1}{2}$ -percent rate of duty is 52,372,574 pounds. Any imports in excess of the quota will be dutiable at 25 percent ad valorem.

Imports from January 1-November 28, 1959, amounted to 49,966,082 pounds, according to data compiled by the Bureau of Customs. The quota for 1958 of 44,693,874 pounds was reached on November 20, 1958.

U. S. IMPORTS AND EXPORTS OF SELECTED FISHERY PRODUCTS, JANUARY-SEPTEMBER 1959:

Summary: During the first nine months of 1959, the most important United States imports--tuna, shrimp, fish meal, and groundfish and ocean perch fillets--exceeded the quantities received during the same 1958 period. The most important exports--canned sardines, canned salmon, canned shrimp, canned squid, and fish oils--were above the quantities shipped during the same period of 1958.

Imports: GROUNDFISH FILLETS AND BLOCKS: Imports of cod, haddock, hake, pollock, cusk, and ocean perch fillets and blocks for January-September 1959 were 0.4 percent above those of the like period of 1958. Cod fillets, up 16 percent; fillets of haddock, hake, etc., up 17 percent; blocks down 9 percent; and ocean perch fillets, down 25 percent. Canadian shipments of fillets and blocks were 19 percent below those of January-September 1958.

TUNA, FROZEN: During January-September 1959, imports of frozen albacore were down 22 percent from the like 1958 period; imports of other species of tuna were up 37 percent. Total imports of frozen tuna from Japan were 4 percent below the nine months period of 1958. Ecuadoran shipments of tuna were more than four times those for the like period of 1958. Shipments from Peru for the first 9 months of 1959 exceeded the previous record annual high. Included in the Peruvian and Ecuadoran figures were tuna caught and transhipped by United States flag vessels.

TUNA, CANNED IN BRINE: Imports during January-September 1959 were about the same as for the comparable period of 1958. A 21-percent decline in canned albacore shipments was offset

by an 8 percent rise in other canned tuna. The increase in imports of canned albacore in brine from countries other than Japan was due in part to large shipments from Spain.

SHRIMP: During January-September 1959, receipts were 33 percent above those of the like period of 1958. Most of the leading suppliers shipped shrimp in greater quantities. Shipments from Hong Kong were stopped until some acceptable method was devised to prevent shrimp from the Chinese mainland from being included in such shipments. Forty-nine countries are presently exporting shrimp to the United States.

CANNED SARDINES: Due to larger receipts from Portugal, Norway, and Denmark, imports of canned sardines in oil during January-September 1959 were up 16 percent over those of the like period of 1958. Imports of canned sardines not-in-oil continued at low levels.

SALMON: Lower shipments of canned salmon in the first 9 months of 1959 from Canada were nearly offset by greater shipments from Japan. Imports of fresh or frozen salmon, nearly all from Canada, were down 26 percent from the first 9 months of 1958.

FISH MEAL: Imports for January-September 1959 were 50 percent above those for the comparable period of 1958. Peru, which has been increasing its production of this product at a high rate in recent years, was the principal foreign supplier.

FISH SOLUBLES: With Denmark providing 76 percent of this product, imports for the first nine months of 1959 were 255 percent above those of the like period of 1958.

OTHER IMPORTS: During January-September 1959, the following products were received in substantially greater quantities than during the same period of 1959; tuna loins and discs, up 59 percent; canned lobsters, up 49 percent; fresh and frozen sea scallops, up 40 percent; canned crabmeat, up 37 percent; oysters (mostly canned), up 18 percent; and fresh or frozen frog legs, up 18 percent. Imports of fresh or frozen lobster

were up about 4 percent. The following products were received in lesser quantities: fresh and frozen flounder fillets, down 10 percent; and sperm whale oil, down 33 percent.

Exports: CANNED SARDINES, NOT IN OIL: Exports during the first nine months of 1959 were about 4 times those of the same period of 1958. The most important customer for this product continued to be the Philippines which took 33 percent of the total.

CANNED SALMON: During January-September 1959, the United Kingdom took nearly 5 times more canned salmon than during the comparable period of 1958. The Philippines accounted for most of balance. Total exports were up 336 percent.

SHRIMP: Canned exports January-September 1959 were up 46 percent over the first nine months of 1958, fresh and frozen exports were up 20 percent. The larger part of these products were shipped to Canada.

CANNED SQUID: During January-September 1959, exports were 47 percent above those of the like period of 1958.

FISH OILS: Totals for the first nine months of 1959 indicate that United States exports of fish oils have rebounded from the low-level of exports in 1958. The largest export market for fish oils was northern Europe. Canada, also a substantial market, took 77 percent less than during the like period of 1958. January-September 1959 exports were 113 percent more than in the same period of 1958.



Virginia

BIOLOGISTS ESTIMATE SPORT FISHERY CATCH IN CHESAPEAKE BAY:

Sport fishermen had to fish for 10 or 12 hours during 1959 to catch as many croaker as they did during one hour in 1956-57, but the fish they caught were generally of a larger size, according to

information collected by a biologist at the Virginia Fisheries Laboratory. This estimate of availability was obtained through interviews with sport fishermen and through log books voluntarily kept by them.



"Most fishermen realize that there has been a sharp drop in the numbers of croaker, and also changes in the abundance of other salt-water fishes," the biologist stated. "Catch record information obtained from log books and interviews make it possible to follow and compare these changes through a season and from one year to another. Those who have been keeping a log of their salt-water fishing trips should now send them to the Virginia Fisheries Laboratory for tabulation."

The records show that spot were caught in great numbers in 1959. Fishing for them was 2-3 times better in 1959 than during the 1958 season, though the fish were somewhat smaller in size. Good catches were made from July to the end of the season in lower Chesapeake Bay, whereas, in 1958, there was a late and short run of spot in the same waters.

Flounder or fluke catches during 1958 were running about 10 times higher than during 1956-57, and were three times higher in 1959 than in the 1956-57 seasons. Gray sea trout catches tell a story of continuing decline within Chesapeake Bay. Croaker, spot, gray sea trout, and fluke have been the mainstays of the sport catch for many years, but the swellfish or puffer joined this group during 1959. Previously reported only as an incidental portion of the sport catch, swellfish may rank ahead of gray sea trout, fluke, and croaker when the 1959 catch data is completely tallied. Perhaps more fishermen are becoming aware of the fine flavor and texture of swellfish and are taking them home instead of throwing them a-

way. Swellfish are marketed as "sea squab" and appear on the menus of some of the best restaurants.

LARGE-SCALE BLUE CRAB TAGGING PROGRAM UNDER WAY:

In the largest blue crab tagging program ever conducted in Chesapeake Bay, biologists of the Virginia Fisheries Laboratory released approximately 4,000 tagged crabs in Tidewater Virginia from May 15 to October 16, 1959.

Many of the tagged blue crabs have been caught by crab fishermen and close to 500 tags have been returned to the Laboratory. A reward of 25 cents is paid for each tag and the person returning the tag is told when and where the tag was placed on the crab. The biologist in charge of this program emphasizes the need for the prompt return of all tags by those who find them.

Of all the crabs released in the York River, only four were caught outside the River, while most of them stayed within ten miles of the spot where the tag was placed on them. Tagged crabs seem to move in no special direction during the summer months. Some males have been caught 6 or 7 times in the same pot and large numbers have been caught more than one time.

Crabs are being tagged and released in the York, Rappahannock, James, and Back Rivers tributary to the Bay in the hope that the biologists will be able to determine where the crabs caught in the winter dredge fishery originate, and at what time they move into the dredging area.

On October 16, 1959, biologists tagged and released 500 blue crabs in the Poquoson-Messick area. It will be of extreme interest to commercial crab fishermen as well as to biologists to know what proportion of the winter catch originates from each Virginia river. Therefore, all Chesapeake Bay commercial fishermen are requested to assist the Laboratory by noting the location of the catch and returning tags promptly.



Wholesale Prices, November 1959

The November 1959 wholesale price index (120.7 percent of the 1947-49 average) for edible fishery products (fresh, frozen, and canned) was down only 0.3 percent from the preceding month. However, compared with November 1958 the drop was sharper—5.9 percent.

Because of lower wholesale prices for frozen dressed halibut and salmon and Great Lakes whitefish, the drawn, dressed, and whole finfish subgroup price index declined 4.3 percent from October to November 1959. The drop was offset slightly by a small increase in the wholesale price for dressed large haddock at Boston and fresh Great Lakes yellow pike. Haddock landings in New England continued light. Compared to November 1958, prices in November 1959 were down 15.2 percent for fresh large haddock, 8.8 percent for frozen dressed halibut, 3.2 percent for large and medium red king salmon, and 16.7 percent for round whitefish at New York. Fresh Lake Superior dressed whitefish prices were unchanged and fresh Great Lakes yellow pike prices were up by about 40.0 percent. The net result was a drop of 5.0 percent in the index for this subgroup from November 1958 to November 1959.

Fresh processed fish and shellfish wholesale prices in mid-November 1959 were higher by 4.0 percent from the preceding month. Higher wholesale prices for small haddock fillets (up 5.9 percent), fresh shrimp at New York City (up 3.9 percent), and fresh shucked oysters (up 3.7 percent) raised the price index of this subgroup for the

second straight month. From November 1958 to November 1959, the fresh processed fish and shellfish subgroup index declined 3.4 percent. Lower prices for small haddock fillets (down 6.2 percent) and fresh shrimp (down 19.8 percent) more than compensated for a sharp increase of 16.6 percent in the prices for fresh oysters. Supplies of oysters on the East Coast were reported below normal.



Peeling shrimp in a breaded shrimp plant, Coral Gables, Fla.

From October to November 1959 the wholesale price index for frozen processed fish and shellfish was unchanged. The first increase in many months for frozen headless 26-30 count shrimp at Chicago (up 1.2 percent) equalized lower prices for frozen haddock fillets (down 2.3 percent) and fro-

Table 1 - Wholesale Average Prices and Indexes for Edible Fish and Shellfish, November 1959 With Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices ¹ / (\$)		Indexes (1947-49=100)			
			Nov. 1959	Oct. 1959	Nov. 1959	Oct. 1959	Sept. 1959	Nov. 1958
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					120.7	121.1	121.6	128.3
Fresh & Frozen Fishery Products:					133.4	134.0	134.8	147.4
Drawn, Dressed, or Whole Finfish:					147.2	153.8	159.9	155.0
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.13	.13	129.2	127.9	153.1	152.3
Halibut, West., 20/30 lbs., drsd., fresh or froz.	New York	lb.	.31	.32	95.9	98.5	101.1	105.2
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.75	.79	168.5	177.2	179.7	174.1
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.73	.75	179.7	185.9	179.7	179.7
Whitefish, L. Erie pound or gill net, rnd., fresh	New York	lb.	.63	1.00	126.4	202.3	146.7	151.7
Yellow pike, L. Michigan & Huron, rnd., fresh . .	New York	lb.	.70	.69	164.2	161.8	170.0	117.3
Processed, Fresh (Fish & Shellfish):					134.0	128.9	124.3	138.7
Fillets, haddock, sml., skins on, 20-lb. tins . .	Boston	lb.	.45	.43	153.1	144.6	117.4	163.3
Shrimp, lge. (26-30 count), headless, fresh . .	New York	lb.	.65	.63	102.7	98.7	105.1	128.0
Oysters, shucked, standards	Norfolk	gal.	7.00	6.75	173.2	167.1	151.6	148.5
Processed, Frozen (Fish & Shellfish):					106.4	106.4	107.2	135.5
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.38	.38	98.8	99.5	98.8	108.6
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.32	.33	99.7	102.0	102.0	127.1
Ocean perch, skins on, 1-lb. pkg.	Boston	lb.	.27	.27	108.8	108.8	108.8	120.8
Shrimp, lge. (26-30 count), 5-lb. pkg.	Chicago	lb.	.63	.62	96.4	95.3	98.0	132.7
Canned Fishery Products:					103.4	103.4	103.4	101.1
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs. . .	Seattle	cs.	24.50	24.50	127.8	127.8	127.8	112.2
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	10.80	10.80	77.9	77.9	77.9	86.2
Sardines, Calif., tom. pack, No. 1 oval (15 oz.), 48 cans/cs.	Los Angeles	cs.	7.50	7.50	88.1	88.1	88.1	96.9
Sardines, Maine, keyless oil, No. 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	8.75	8.75	93.1	93.1	93.1	87.5

¹/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

zen flounder fillets (down 0.7 percent). A sharp drop of 21.5 percent occurred in the wholesale price index for this subgroup from November 1958 to November 1959. Declines of 27.4 percent for frozen shrimp, 21.6 percent for haddock, 9.9 percent for ocean perch, and 9.1 percent for flounder fillets at Boston reflected better supplies of both domestic and imported products.

Canned fish prices in November 1959 were the same as in October and September. Stocks of all items in the subgroup, except tuna, were smaller as of the end of November 1959 than they were a year earlier. The pack of California

sardines in 1959 is forecast at only one-third or less of the 1958 pack. The Maine sardine pack as the 1959 season ended on November 30 was about 350,000 cases below the pack of 1958, which was only fair. Although there was a small amount of salmon packed in November 1959, it did little towards relieving the shortage of this canned product. The November 1959 canned fish price index was up 2.2 percent from November 1958. Higher prices for canned pink salmon (up 13.9 percent) and canned Maine sardines (up 6.4 percent) were offset by lower prices for canned California sardines (down 9.6 percent) and for California light meat tuna (down 9.1 percent).



FROM PIGFISH TO PORPOISE

Porpoises are dolphins because they are members of the dolphin family, the Delphinidae. Most of the technical books list the particular species found off southeastern United States as dolphins. But they are more commonly called porpoises because they have long been known by that name all along the Atlantic and Gulf coasts.

To many scientists in this country and to almost all European zoologists, porpoises are somewhat different animals from the ones we are acquainted with. The "true" porpoises are small (only 5 or 6 feet long), blunt-headed (instead of long-snouted), and have spade-shaped (instead of conical) teeth. Nevertheless, they too are usually included in the family Delphinidae, though some authorities have placed them in a family of their own.

One of these "true" porpoises is the most common member of the dolphin family in European coastal waters, holding the position there that our bottlenosed porpoise (or dolphin) holds along the coast of the United States. The Old World porpoise has been well known to fishermen in those waters for a long time. The name "porpoise" is hundreds of years old. It has been traced back through the Old French *porpeis* to the Latin *porcus pisces*, meaning pigfish or hogfish. It is interesting to note that even today porpoises (or dolphins) along the United States coast are sometimes called "herring hogs" by American fishermen, many of whom believe, quite mistakenly, that these aquatic mammals eat their weight in fish every 24 or 48 hours. (In point of fact they eat only about 5 percent of their weight a day.)

Fishermen and seafaring men who migrated to this country from Europe or England found a small cetacean abundant in these waters. It was similar to the porpoise they knew along the European coast--at least it had a similar appetite for fish--so they simply transferred the name to this New World "fishhog."

The net result is that we have two common names for each of the three species of small cetacean that are common in southeastern United States waters. The bottlenosed dolphin is our (common) porpoise. The longsnouted dolphin, which occurs farther offshore, is called the spotted porpoise. And the wide-ranging and attractively-marked common dolphin is known as the saddleback porpoise. (Mariner, December 1958.)



International

EUROPEAN FREE TRADE AREA

BRITISH-NORWEGIAN FISH TALKS BREAK DOWN:

The discussions in London in mid-October 1959 between British and Norwegian Ministers regarding trade in fish and fish products within a European Free Trade Area broke down. The discussions centered on a proposal by Norway that fishery products be treated as ordinary industrial goods within the area. This proposal has caused great concern to the British fishing industry, which fears that the British market would be flooded with foreign fishery products.

The Norwegians are seeking easier access to the British market for Norwegian fish products in return for the opening up of the Norwegian market for industrial goods under the new agreement.

Last summer when the proposals were submitted at the Stockholm conference, it was decided to leave the matter open for future discussion; hence the London meeting. At the time the British argued that while a reduction and elimination of the tariff on canned fish was possible there was a difference in the case of frozen fish.

The present British tariff on most fish products is 10 percent.

The distant-water trawler owners desired that any concessions made on tariffs should be matched by some reassurance regarding the fisheries limits problem.

The Hull Fishing Vessel Owners' Association says: "Our direct interest in connection with this proposed agreement is that if it permits additional quantities

of fish or fish products to be exported from Norway to this country it will affect our own market.

"The proposal of the Free Trade Area Outer Seven would involve an immediate or a progressive abolition of the ten percent ad valorem duties on all imported wet fish. Until we know what fish it is proposed should be allowed in we are not in a position to comment." (The Fishing News, October 23, 1959.)

FIRST SOUTH AMERICAN ATLANTIC REGIONAL TECHNICAL CONFERENCE ON EXPLOITATION OF THE SEA

A regional International Fisheries Conference was held in Montevideo, Uruguay, September 28-30, 1959, under the auspices of the Food and Agriculture Organization. The conference was attended by delegations from Uruguay, Argentina, Brazil, and two representatives of FAO.

The meeting (termed as highly successful by the participating technicians) re-emphasized the importance of increased scientific and commercial exploitation of the South Atlantic. Necessity for unification of efforts and joint studies among the three countries was also highlighted. A Uruguayan participant in the conference stated that the four most important final recommendations adopted at the conference were the following:

(1) To intensify studies and investigations about tuna fishing in order to obtain larger catches and to find out more about the migration habits of tuna;

(2) To share the services of the shrimp fishing expert recently contracted by the Uruguayan Government with Argentina and Brazil, each country paying one year's salary of the technician;

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(3) To intensify jointly the whale fishing industry and request from the FAO on a regional basis the services of an expert to advise the three countries;

(4) To decide on a joint commercial policy which would insure all three countries the highest possible earnings from their fishing industry.

The delegates were pleased with the progress made at the conference and both commercial and scientific interests expressed satisfaction that a closer regional understanding of the whole fisheries' complex had been achieved. A spokesman for the Uruguayan delegation stated that the findings of this conference will be used as a basis for a joint working plan which will eventually benefit each country by increased yields from the fishing industry and at the same time assure equal costs and profits and avoid repetition of scientific endeavors.

The need for additional technicians was repeatedly stressed and it was decided to make all future requests for FAO technicians on a regional basis, thus decreasing the cost of the expert's services to each country.

This conference appears to be indicative of recent intense interest displayed in Argentina, Brazil, and Uruguay to increase the fishing potential, an effort based to a great extent on the increasing meat shortage in those countries. (United States Embassy in Montevideo, October 5, 1959.)

FOOD AND AGRICULTURE
ORGANIZATION

TENTH SESSION OF CONFERENCE:

The Tenth Session of the Conference of the Food and Agriculture Organization of the United Nations (FAO) convened at Rome, October 31, 1959.

The Conference of the FAO, which was established in 1945, is the chief legislative and policy-making organ of the Organization. Its membership comprises 76 countries. The chief aims of the FAO are to raise the levels of nutri-

tion and standards of living of the people under the jurisdiction of the Member Governments; secure improvements in the efficiency of production and distribution of all food and agricultural products; and to better the conditions of rural populations.

This session of the Conference considered, among other things, the world situation and outlook in respect to food and agriculture; food production in relation to population trends; economic position of farm populations; problems of agricultural development in underdeveloped countries and a proposed Freedom-from-Hunger Campaign. It also determined the budget for the next biennial period.

The Conference meets every two years in regular session and may meet in special session if necessary.

OCEANOGRAPHERS CALL FOR WORLD FISH CENSUS

How many fish are there in the sea, and where they are and how their numbers can be increased to feed the ever-increasing human population of the earth were practical questions in the background of one session of the International Oceanographic Congress at the United Nations in September 1959. But no one among the 500 experts from 38 countries knew the answers.

The great need for human nutrition is protein and fish is a rich source of proteins. If they could be raised as beef on fertile watery farms and ranges their numbers could be increased enormously and the fish themselves would grow to much larger size. But their growth and numbers are limited by the amount of food they can find. Increasing fish production requires an increase in the microscopic fish food called plankton on which fish life depends. A plankton census must precede a fish census.

Studies of plankton made by the Scottish Oceanographic Laboratory were reported to the Congress. These microscopic plants and animals occur in astronomical numbers in most sea water. More than 50,000 samples of plankton were analyzed annually and each was separated into about 100 different species to discover where each is most plentiful. A plankton map of the North Sea and the nearby parts of the Atlantic and Arctic oceans will soon be published as a guide to the fish-feeding grounds.

Extension of such a map to the entire ocean and to a world fish census is being discussed as a major project in the near future for one of the international organizations such as UNESCO or the International Council of Scientific Unions. Meanwhile there have been some successful transplantations of young fish over long oceanic distances to better feeding grounds. This was done for the European plaice with a large increase in the catch at the new location. The striped sea bass has been successfully transferred from the Atlantic to the Pacific. But every attempt to grow Atlantic shore oysters in the Pacific has failed. Much research will be needed on sea plants and small animals before any effect can be expected on the catch of edible fish.

A professor of Cambridge University in England reported to the Congress on the fantastic forms that have developed among fishes of the great depths of the ocean—fish with mouths that extend half the length of their bodies, stomachs that can be extended to permit a fish to devour

International (Contd.):

a fish larger than itself, and luminous bait that some fish carry before them on long antennae-like organs to attract their food. The reason for the existence of these queer fish is unknown but the professor claimed that the absolutely unchanging environment in the dark depths of the sea would permit mutation to run wild over millions of years. In the deep trenches that sink a mile or more below the great plains of the sea bottom, the odd species that develop in one trench may be quite different from those in a neighboring trench.

WHALING

RUSSIA ASKS NORWAY AND NETHERLANDS TO RECONSIDER WITHDRAWAL FROM CONVENTION:

A Soviet Foreign Ministry Note (No. 79/osa) of October 12, 1959, forwarded to the United States Government for deposit identical Soviet notes of October 3, 1959, to Great Britain, the Netherlands, Norway, and Japan. These notes concern the Soviet attitude toward the withdrawal of Norway and the Netherlands from the International Whaling Convention of 1946. A translation of the note to Great Britain follows:

"The Ministry of Foreign Affairs of the Union of Soviet Socialist Republics presents its compliments to the Embassy of Great Britain and has the honor to state the following:

"The Government of the Union SSR has examined questions connected with the whaling industry in Antarctica and the situation created as a result of the withdrawal of Norway and Holland from the International Convention on Regulation of the Whaling Industry of 1946.

"As is known, 20 whaling flotillas have been working in the Antarctic during past years, among this number nine Norwegian flotillas and one Dutch flotilla, which obtain approximately half of the whaling quota established in the Convention. It is not by chance, therefore, that Article X of the Convention states that it comes into force on condition of the obligatory participation of Norway and Holland. Under these conditions the withdrawal of Norway and Holland from the Convention signifies the disruption of the cooperation, which has developed successfully for more than 10 years in the field of protection of the reserves of whales, and the beginning of unregulated exploitation.

"The question arises whether or not everything has been done to avoid those undesirable consequences for the supply of whales in the Antarctic which will take place as a result of the situation which has developed.

"In analyzing the proceedings of the London Conference of five countries which took place at the end of June of this year, it is necessary to acknowledge that efforts were made on the part of a number of countries, in particular on the part of Norway, to reach an agreement acceptable to all within the framework of the Convention on the basis of known recommendations accepted by the same countries in the conference in London in November 1958. As the result of this conference and the conferences which preceded it, some approximation of points of view occurred which, however, did not result in final agreement with respect to the distribution of the general quota for whaling among the main countries which carry on whaling in the Antarctic.

"In this connection, the Government of the Union SSR cannot but express its concern, since scientific data show that the state of the reserves of whales in the Antarctic continues to remain acute, and the beginning of unregulated whaling with the present season will inevitably lead to their rapid reduction to a level at which whaling will become entirely unprofitable for many countries. Under these circumstances it will in the future be still more difficult to reach agreement on protection of reserves of whales in the Antarctic and on rational conduct of whaling.

"The Government of the Union SSR considers that all possibilities have not yet been exhausted for reaching agreement on the basis of the aforementioned 1958 London recommendations. The Soviet Union for its part is ready to cooperate fully in strengthening international collaboration in the matter of protection of reserves of whales and the rational conduct of whaling on the basis of the 1946 Convention.

"In connection with this the Government of the Union SSR hopes that the Governments of Norway and Holland will find it possible to reconsider their

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decision to leave the Convention and will devote efforts to reaching agreement between the countries which conduct whaling in the Antarctic. Such a step on the part of Norway and Holland would without doubt be welcomed by all participants of the Convention.

"At the same time, the Government of the Union SSR is compelled to state that, if the force and authority of the Convention, which have been weakened by the withdrawal from it of Norway and Holland, are not restored by the beginning of the whaling season in the Antarctic, the Soviet Union, under these new conditions, will be guided by the Convention in the conduct of whaling in the Antarctic, with the position and practice of other countries taken into account and having in view the interests of the Soviet whaling industry."



Angola

FISH MEAL PLANT INSTALLED BY NORWEGIAN FIRM:

A Norwegian firm has equipped an entire fish-meal plant at Porto Alexandre in Angola. The capacity of the plant is 150 metric tons a day, according to the journal Norway Exports. The contract price was £80,000 (US\$224,000). The Norwegian firm installed the Angolan plant and is providing technical assistance for six months after the plant starts operating.

The firm's connection with the Angolan fish-meal industry started in 1956 when some meal from that area, sundried by many small plants, was rejected by the German market. (The South African Shipping News and Fishing Industry Review, September 1959.)



Argentina

IMPORT SURCHARGES REMOVED ON LARGE FISHING VESSELS:

The Argentine Government has issued an executive decree (No. 13,287 of October 22, 1959, published in the Boletín Oficial of November 3, 1959) which eliminates surcharges and prior deposits on the importation of deep-sea fishing vessels. The free-entry privilege applies to vessels which are imported and registered in the country within a period of 360 days from the date of the decree.

The decree establishes that three Government departments (the Dirección Nacional de la Marina Mercante y Puertos, the Dirección General de Pesca, and the Prefectura Nacional Marítima) must certify in advance that each proposed importation is suitable as a deep-sea fishing vessel. Following this procedure, the Secretariat of Industry and Mining and the Secretariat of the Navy must prepare in each case a document for submission to Customs certifying that the proposed importation is eligible for free entry under the decree. The free entry will not be applicable to types of vessels which can be produced in "technically adequate conditions" by local industry. The two Secretariats will decide whether the proposed importation can be satisfactorily produced in the country.

The decree answers repeated complaints by spokesmen of the Argentine fishing industry that development of the industry has been held up for years by restrictions on importation of vessels, among other factors. Most of the present Argentine deep-sea fishing fleet (some 26 vessels) is antiquated and ill-equipped. Although credit is very tight in the Argentine market at present, it is believed that some of the fishing companies will be able to take advantage of this decree. The decree does not require the vessels to be imported be new.



Australia

CANNERIES SET TUNA PRICE FOR 1959/60 SEASON:

The tuna canneries owned by a Sydney, Australia, firm and located in Eden and Narooma, New South Wales, will pay 6d. per pound (about 5.6 U. S. cents a pound or US\$112 a short ton) for raw tuna delivered to the canneries in the 1959/60 season. The canneries will take a minimum of 1,200 tons. Additional purchases will depend on market conditions as the season progresses.

Good signs of bluefin tuna were reported outside the 100-fathom line south-east of Lakes Entrance, Victoria, the latter part of July and early in August. These tuna were mainly in the 40-60 pound size group, the Australian Fisheries Newsletter reported in its September 1959 issue.

EXPORTS OF SPINY LOBSTERS CONTINUE TO RISE:

During the year ending June 30, 1959, Australian spiny lobster exports (practically all went to the United States) rose 14 percent in quantity. The value (about US\$7 million) was over five times the value of spiny lobster exports to the United States ten years ago.

The Australian Ministry of Primary Industry in releasing these figures said that the number of men and vessels engaged had increased in all spiny lobster fishing areas, but that the fishermen had been forced to operate over larger and larger areas and in many cases were fishing out to the 60-fathom line, the United States Embassy in Canberra reported on October 16, 1959.

LAND-BASED WHALING SEASON ENDS:

Two of the five Australian coastal whaling stations obtained their 1959 permitted quota in August and ceased whaling for this season.

Byron Bay commenced on June 3 and finished on July 28, having taken

150 whales in 56 days, compared with 120 whales last year in 57 days.

Moreton Island, which commenced the season on June 8, finished on August 9, having taken 660 whales in 63 days, compared with 600 whales last year in 65 days.

At Norfolk Island, where whaling commenced on June 12, 87 whales had been taken to August 8.

At the same date, Cheynes Beach, which commenced on May 18, had taken 148 humpbacks and 6 blue whales.

Also as at August 8, Carnarvon, which commenced on May 17, had taken 332 humpbacks, 6 blues and 1 fin whale. (The Fisheries News Letter, Sept. 1959.)

NEW SPECIES OF SHRIMP FOUND IN DEEP WATER BY EXPLORATORY VESSEL:

A species of shrimp not previously known in Australian waters was caught by the Government-chartered survey vessel Challenge in the Australian Broken Bay-Norah Head area in 145-155 fathoms. The shrimp survey is being conducted by the Australian Fisheries Division.

The species was later identified by a marine biologist as "most certainly" of the genus Hymenopenaeus. He said that if it proved to be a new species, it would be named after the Challenge. The shrimp has an average body length of 7½ inches, bright pink body, and tailfin marked with deep red. A species of Hymenopenaeus is trawled commercially in the United States where it is known as royal-red shrimp (Hymenopenaeus robustus).

Three other new species of shrimp commercially unimportant, were also found in June and July 1959.

Concentrations of Parapenaeus australiensis were found in Stockton Bight mixed with king shrimp. P. australiensis is orange-red with a red tailfin, grows to about 6½ inches, and is very tasty. It may still be found in commercial quantities. P. australiensis is nearly always found with king shrimp in the

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proportion of about 2 to 3. Its optimal habitat seems to be the range between 45 and 65 fathoms, and it does not occur further inshore. The larvae have been found in plankton catches indicating that this shrimp spawns much earlier than all Australian commercial species.

The red shrimp (*Aristaeomorpha foliacea*) was taken by the Challenge in the Broken Bay-Norah Head area. This shrimp, which was a record for New South Wales, was found 45 years ago by the Commonwealth research trawler Endeavour in the vicinity of Gabo Island. This species seems to be common below 110 fathoms for it has been captured on nearly all tows on the Continental Slope. It is not certain, however, whether it does not school well above the bottom, in which case it may have been encountered on the net's way up. Further work is necessary to establish whether it can be taken in commercial quantity. In July, the Challenge worked first in the Norah Head-Newcastle area, then north to Port Stephens and back to Sydney.

A run of good weather enabled further deep-water work to be carried out off Norah Head-Newcastle. Several royal-red and one red shrimp were taken, but there was no sign of shrimp in quantity. The shelf slope was steeper and rougher in this area.

King and red shrimp were caught off Newcastle in 30 to 50 fathoms, but commercial vessels had ceased fishing for lack of sufficient quantities, although large catches had been obtained a month earlier.

Leaving Sydney, the Challenge worked off Botany Bay and then Jervis Bay. There the water temperature was 20° C. lower than a month earlier and the number of shrimp taken was even less.

A considerable time was spent looking for suitable bottom in depths over 80 fathoms from east of Ulladulla to Jervis Bay. The bottom in this area seemed to be all very rough and the slope from 90 fathoms was extremely

steep and cut by deep gutters. None of the area covered was workable.

The Challenge then worked in Shoalhaven Bight, and off Lake Illawarra and Cronulla, before returning to Sydney.

Small catches of school shrimp were made off Crookhaven River entrance. Several commercial vessels were working in this area and catches had been better several days previously.

Generally speaking the catches showed that there was a poorer indication of king shrimp in the deeper water than there had been about a month earlier. (Australian Fisheries Newsletter, September 1959.)

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NEW TYPE SPINY LOBSTER FISHING VESSEL:

An unusual type spiny lobster fishing vessel, under construction at Hamilton Hill, Australia, is expected to do the work of two conventional vessels. The vessel is being built by the captain-owner for his own use.

The new vessel will be steered by two hemispherical metal shells around each propeller. By closing the shells the boat will go astern.

Instead of pulling spiny lobster pots up over the side, specially designed gear will automatically pull the pots up over the sloping stern.

Hexagonal floats and thin steel cables will be used. A winch, recessed to take the six-sided floats, will wrap the cable neatly around the float as it is revolved.

The bases of the pots can be quickly detached, the spiny lobsters removed, and freshly-baited bases clipped on.

A 300-case freezing chamber will be added later.

The double-skinned, steel, 41-foot boat, with twin Diesel engines, was designed jointly by a Fremantle marine designer and the owner.

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Australia (Contd.):

SNAPPER CATCHES IMPROVED BY USING TRAPS:

Use of traps instead of line fishing for snapper has been producing heavy catches in Western Australia from the Shark Bay grounds.

The Fremantle Fisherman's Co-operative Manager said at the end of July 1959 that Co-operative boats had already caught almost 500,000 pounds of snapper.

Among the big catches reported were 67,000 pounds taken in 11 days' fishing by the new aluminium alloy vessel Lady of Fatima, 54,000 pounds by Miss Phoenix, 26,000 pounds in each of three trips by Kingfisher, and 26,000 pounds by Proton.

In mid-August, the snapper was being sold direct from the boats to merchants at an average price of about 18 U.S. cents a pound. (Australian Fisheries Newsletter, September 1959.)



Belgium

MINIMUM EX-VESSEL FISH PRICES ESTABLISHED:

The Belgium Ministry of Agriculture has approved the 1959/60 minimum prices for fish sold at wholesale markets on the Belgian coast. The prices were fixed by the Rederscentrale (Fishing Companies Association) of Ostend at 2.4-4.5 U. S. cents a pound according to the size and quality of the various species.

These minimum prices for fish went into effect on September 28, 1959. The Rederscentrale is working out a minimum price system for shrimp and sprat.

The following species are sold at a minimum price of 5.00 Belgian francs per kilo (about 4.5 U. S. cents a pound): cod (over 60 cm. or 23 inches); haddock (over 35 cm. or 14 inches); coalfish (over 60 cm.); pollock (over 60 cm.); ling (over 60 cm.); whiting, large (over

30 cm. or 12 inches); gurnard, large (over 35 cm.); sea bream, large (over 35 cm.); dogfish, large (over 60 cm.); plaice (over 30 cm.); dab (over 30 cm.); and ray, large (over 50 cm. or 20 inches width of wings).

The following species are sold at a minimum price of 4.00 Belgian francs per kilo (about 3.6 U. S. cents a pound): coalfish, small (from 30 to 60 cm. or 12-24 inches); pollock, small (from 30 to 60 cm.); ling, small (from 30 to 60 cm.); whiting (from 25 to 30 cm. or 10-12 inches); brill, small (over 50 cm.); conger eel; gurnard, small (less than 35 cm.); sea bream, small (less than 35 cm.); catfish; flatfish, small (from 25 to 30 cm.); dab, small (from 25 to 30 cm.); plaice (from 25 to 30 cm.); witch (over 28 cm. or 11 inches); ray (from 35 to 50 cm.); grey gurnard (over 28 cm.); latchet (over 28 cm.); mackerel; and herring.

The following species are sold at a minimum price of 3.00 Belgian francs per kilo (about 2.7 U. S. cents a pound): houndfish, small (from 50 to 60 cm.); dogfish, small (from 50 to 60 cm.); sand dogfish (over 50 cm.); flounder (over 30 cm.); cat ray (from 30 to 35 cm.); small herring; and pilchards.

The following species are sold at a minimum price of 2.60 francs per kilo (about 2.4 U. S. cents a pound): small mackerel and herring for canneries.

Whenever the wholesale prices offered at the Belgian coast are lower than the fixed minimum prices, the fish will be purchased at those minimum prices by the Government Purchase Program of the Ministry of Agriculture, and sold to the fish meal industries. (United States Consul in Antwerp, October 7, 1959.)



Canada

CONSUMPTION OF FISHERY PRODUCTS IN 1956 AND 1957:

In terms of edible weight the consumption of fishery products in Canada in 1957 amounted to 13.4 pounds per capita--unchanged from 1956. In both years, Ca-

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nadians consumed 7.2 pounds of fresh and frozen fish and shellfish, 4.5 pounds canned fish and shellfish, and 1.7 pounds of smoked, salted, and pickled fish.

In the United States per capita consumption of fishery products in 1957 amounted to 5.6 pounds of fresh and frozen fish and shellfish, 3.9 pounds of canned fish and shellfish, and 0.6 pounds of smoked, salted, and cured fishery products--or a total of 10.1 pounds, edible weight.

NEWFOUNDLAND FISHERY TRENDS, 1958-59:

Stormy weather, a shortage of bait, and a scarcity of cod on Newfoundland's inshore fishing grounds in 1958 are given as the causes of the worst cod fishery in 20 years. Consequently, most fishermen were barely able to qualify for the minimum unemployment insurance (C\$9.00 per week for 15 weeks). Due to the scarcity of cod, exporters of salted fish were unable to supply their markets before the year's end.

There were few developments of any consequence in the fishing industry which would cause optimism. Efforts made to obtain financial aid from the Canadian Government for fishermen were unsuccessful. There was some legislation which may be helpful in the future, but afforded no immediate relief, except for modest employment in some areas. These included the construction of 20 fishing stages, the introduction of four portable bait lockers which are said to have proven successful, and the purchase of two refrigerator trucks to transport bait from freezing plants to holding lockers.

Production of frozen fillets in 1958 increased over 1957 for all species except cod. Had it not been for the large increase in production of frozen fillets the fisheries most likely would have been a complete failure.

The outset of the 1959 fishery had prospects of being a repetition of the previous year due to adverse weather

conditions and heavy ice. However, after a late start landings began to pick up. It is now considered that the 1959 fishery may be the best in the past five years due to an excellent cod trap fishery during July and August. The industry as a whole should enjoy a healthy and profitable year in 1959, and should give encouragement to more fishermen to return to the sea.

As in 1958, there were few developments offering encouragement to the industry or the fishermen as a whole. Probably the most noteworthy was the purchase of a freezing plant at Fortune, which was closed for nearly three years, by a Chicago, Ill., firm. The reopening of this plant means the re-employment of from 200-250 persons, when operating at full capacity.

The Newfoundland Associated Fish Exporters' Ltd. (NAFEL) exclusive license to export salted cod expired on July 31, 1959. While there were fears in some circles that if order was not retained in the marketing of salt fish, havoc in the industry might occur, this apparently has not proven to be the case so far. Since NAFEL lost its charter, it has continued to function as an exporter of salted fish. According to official sources there has been little change in the organizational pattern of NAFEL, and the majority of fish producers are continuing to use its services.

With a view toward improving the quality of processed fish, which would benefit the industry, the Canadian Government passed the Meat and Canned Foods Act and the Fish Inspection Act, both of which became effective in Newfoundland on July 1, 1959.

In July 1959 the Canadian Government announced, without giving any advance notice, that it was relinquishing the administration of the fish-culling regulations in Newfoundland. Subsequent to this announcement the Provincial Government stated that it was not in a position at present to take over this work due to lack of trained personnel and funds. This state of affairs has caused much concern to the fish trades group who have declared that without culling regulations the fishing industry has been

Canada (Contd.):

placed in a precarious state. Many are afraid that some producers may include inferior quality with choice fish destined for "high class" overseas markets, thus causing a loss of the market. It is believed that when the Newfoundland Provincial House of Assembly meets again it will be pressured by the Fish Trades Association and other interested groups into taking some action to rectify the present situation.

Landings, 1957-58: Total fish landings for the year 1958 amounted to 464 million pounds, valued at C\$11,272,000, as compared with 576 million pounds, valued at C\$13,639,573 in 1957, a decrease of 19.4 percent in quantity and 17.4 percent in value. In 1958, as in 1957, cod, haddock, caplin, and squid were responsible for a further decline in total landings. Landings of cod totaled 300 million pounds in 1958, as compared with 401.6 million pounds in 1957, a decrease of 25.4 percent. Landings of haddock declined by 30.1 percent with 30.8 million pounds in 1958, as compared with 44 million pounds in 1957. Caplin (used for bait) dropped

Table 1 - Newfoundland's Offshore 1958 Fishing Fleet and Landings,		
Vessel Type	Number	Total Landings (Round Weight)
		1,000 Lbs.
Trawlers	17	72,591
Draggers	8	17,832
Danish seiners	6	665
Long liners	23	6,040

17.0 percent as they failed to appear in the usual large quantities, and squid, another form of bait, registered the largest decrease in total landings. Only 1.6 million pounds of this favored bait were landed, as compared with 5.8 million pounds in 1957, a drop of 72.7 percent. The only noticeable increases registered among the major species were for ocean perch, sea dabs, and grey sole. Landings of ocean perch were up 58.2 percent, 25.4 million pounds being taken, as compared with 16.1 million pounds in 1957. Landings of sea dabs and grey sole increased by 17.4 percent over 1957. Herring, used primarily as bait, also registered an increase in total landings of 30.8 percent over the 1957 catch. Landings of salmon, most valuable spe-

cies on a per pound basis, continued to increase. 2.2 million pounds were landed in 1958, as compared with 2.0 million pounds in 1957, an increase of 9.6 percent.

There were no laws or regulations enacted during 1958, affecting the Newfoundland fishery. (United States Consulate in St. John's, Newfoundland, reported on October 7, 1959.)

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PRODUCTION, IMPORTS, EXPORTS OF MARINE OILS:

If the Canadian fish landings late in 1959 are at all satisfactory, the production of marine oils for 1959 will exceed the 5.7 million Imperial gallons produced in 1958. Production of both cod and British Columbia herring oil was higher through July 1959 as compared with January-July 1958.

In 1958, as compared with 1956 and 1957, increasing amounts of marine oil were used in the manufacture of margarine, and decreasing amounts in the manufacture of shortening. In 1959 the amount of marine oil used in those products was much lower than in 1958, being replaced largely by cheaper vegetable oils and lard. During January-August 1959, only 11.7 million pounds of marine oils were used in margarine and shortening as compared with the use of 24.8 million pounds during the comparable period of 1958.

In 1956 and 1957 Canada was a net exporter of marine oils and in 1958 imports and exports about balanced. In 1959, as a result of the large over-all supply of fats and oils, Canada was a heavy exporter of marine oils. During the first eight months 1959, as compared with the comparable period in 1958, larger supplies of cod-liver and herring oils moved to the United States and the United Kingdom, respectively.

Imports in 1959 were much lower than in 1958, the largest decrease being in fish and marine animal oils from the United States. (See tables 1, 2, and 3 on following page.)

Table 1 - Canada's Production of Marine Oils, 1956-58 and January-July 1958-59

Table 1 - Canada's Production of Marine Oils, 1956-58 and January-July 1958-59					
Products	January-July		Year 1958	Year 1957	Year 1956
	1959	1958			
	..... (Imperial Gallons)				
<u>Atlantic:</u>					
Cod oil	448,467	297,877	630,540	823,323	965,198
Herring oil	1/	1/	1/	107,900	148,271
Other (seal, etc.)	2/265,056	2/557,566	2/938,562	712,843	405,436
Total	713,523	955,443	1,569,102	1,644,066	1,518,905
<u>British Columbia:</u>					
Herring oil	4,127,761	2,180,510	4,127,761	2,180,510	4,725,903
Grand Total	4,841,284	3,135,953	5,696,863	3,824,576	6,244,808
1/Not available.					
2/Includes herring oil.					

1/Not available.

2/Includes herring oil.

Table 2 - Canada's Exports of Marine Oils, 1956-58 and January-August 1958-59

Table 2 - Canada's Exports of Marine Oils, 1956-58 and January-August 1958-59					
Products	January-May		Year 1958	Year 1957	Year 1956
	1959	1958			
	.....(Imperial Gallons).....				
<u>Cod Liver Oil:</u>					
Total Exports	449,482	321,106	540,867	601,550	655,020
To United States	390,884	257,599	443,893	571,585	655,020
<u>Herring Oil:</u>					
Total Exports.....	1,725,893	-	739,236	20,100	1,374,569
To United States	56,196	-	277,733	20,100	139,234
<u>Whale Oil:</u>					
Total Exports.....	109,546	48,876	356,715	213,102	349,150
To United States	53,724	43,167	87,290	193,312	257,776
<u>Other Fish Oil:</u>					
Total Exports.....	423	1,219	5,078	33,417	13,379
To United States	420	1,217	5,076	33,410	12,008
Total Exports.....	2,285,344	371,201	1,641,896	868,169	2,392,118
Total to United States	501,224	301,983	813,992	818,407	1,064,038

Table 3 - Canada's Imports of Marine Oils, 1956-58 and January-May 1958-59

Table 3 - Canada's Imports of Marine Oils, 1956-58 and January-May 1958-59					
Products	January-May		Year 1958	Year 1957	Year 1956
	1959	1958			
	..... (Imperial Gallons ^{1/})				
<u>Cod Liver Oil:</u>					
Total Imports	80,328	76,674	231,081	122,031	134,117
From United States	-	11	11	537	396
<u>Whale and Sperm Oil:</u>					
Total Imports	13,391	6,912	21,225	24,497	28,889
From United States	11,703	3,898	10,199	1,118	-
<u>Other Fish and Marine</u>					
<u>Animal Oils:</u>					
Total Imports	109,312	982,341	1,409,910	301,874	328,427
From United States	107,419	966,937	1,375,162	280,563	300,160
Total Imports all Marine					
Oils	203,031	1,065,927	1,662,216	448,402	491,433
Total from United States ..	119,122	970,846	1,385,372	282,218	300,556

^{1/}One Imperial gallon is equal to 1.2009 U. S. gallons.

^{1/}One Imperial gallon is equal to 1.2009 U. S. gallons.

Canada (Contd.):

REFRIGERATION STANDARDS FOR FRESH AND FROZEN FISHERY PRODUCTS AMENDED:

Regulations on refrigeration under section 5.4.9 of Canada's Specification 32-GP-141A--the voluntary standard for fresh and frozen fishery products are being amended. The fishing industry was not unanimous on this change, but a majority favored it. The amendment will read:

"5.4.9 Frozen fish or processed fish shall be continuously maintained at the lowest practical temperature during frozen storage. A temperature not higher than -10° F. is recommended. Delivery of frozen fish, acceptable under this Specification, if made by railway transport, shall be made under maximum icing procedures which are as follows for the winter and summer seasons:

"April 1 to November 30 inclusive: Initially ice to capacity with crushed ice and 30 percent salt about 24 hours before loading commences, and re-ice to capacity after loading completed. Endorse billings: - 'Re-ice in transit, to capacity, at all regular icing stations with crushed ice and 30 percent salt.'

"December 1 to March 31 inclusive: Initially ice to capacity with crushed ice and 30 percent salt about 24 hours before loading commences, and re-ice to capacity after loading completed. Endorse billings: - 'Re-ice in transit, to capacity, at all regular icing stations with crushed ice and 30 percent salt, only when car requires total 1,500 pounds or more ice.'

"In the railway transport of fresh fish acceptable under this Specification, maximum icing procedures of the rail cars will be observed with the mixture of crushed ice and 10 percent salt in summer and crushed ice alone in winter.

"Delivery of frozen or fresh fish, acceptable under this Specification, if made other than by railway transport, shall be made by a carrier using good commercially practical refrigeration."

The change from the previous wording of the Specification consists of the addition of the specific instructions for re-icing for railway shipments. Many shippers now use these same icing instructions but, once the Specification has been officially amended, these instructions will be mandatory for moving products inspected under this Specification by rail.

SMALL-TYPE GILL-NET BOAT BUILT FOR FRASER RIVER SALMON FISHERY:

The forerunner of a possible trend in smaller size gill-net boats for the Fraser

River salmon fishery was viewed recently. For the past few years the move has been to larger gill-netters of about 35 feet in length; however, this isn't the case with the Agnes T, built by a Steveston, British Columbia, shipyard.

The Agnes T is 30 feet long with a beam of 8½-feet, has the popular new style wheelhouse which provides more comfort and visibility, and boasts automatic steering equipment with power drum and steering controls at the stern. The vessel is powered by a 140-hp. gas engine. (Canadian Trade News, September 1959.)



Colombia

NEW FISH FREEZING PLANT INSTALLED:

A new fish-freezing plant has been installed in the Colombia Pacific Coast port of Buenaventura. The plant was expected to begin operations in November or December 1959.

The new freezing plant has a storage capacity of 500,000 pounds and a freezing capacity of 30 metric tons, plus space for drying 30 tons of cod. The plant cost about US\$191,000 (at rate of exchange 7.84 pesos equal US\$1), employs 300 persons, and is supplied by 50 fishing vessels with a complement of 250 fishermen.



Cuba

JOINT CUBAN-JAPANESE TUNA PROCESSING FIRM DENIED NEW INDUSTRY STATUS:

A Cuban Ministry of Treasury resolution published in Official Gazette No. 195 of October 15, 1959, denied "new industry" benefits to the Cuban firm Pesqueras Internacionales, S. A. (International Fisheries Incorporated). The firm originally requested these benefits on July 5, 1957. The Treasury resolution admitted that some of the firm's seafood products, such as sausages and hams manufactured from fish and shellfish, were considered new to Cuba as far as presentation and preparation were con-

Cuba (Contd.):

cerned. However, they were deemed not to be too dissimilar from products already manufactured by various firms in Cuba which have been packing fish and shellfish items over many years.

As far as is known, no production of hams or sausages by the referenced firm for Cuban consumption ever took place. Those tuna loins which were manufactured from the tuna catch of the Japanese tuna clipper *Sumiyoshi Maru*, were exported to the United States for final processing. The Treasury ruling is not expected to affect seriously the operations of the Cuban-Japanese firm, the United States Embassy in Habana reported on November 12, 1959.



Denmark

FISHERIES TRADE FAIR HELD IN COPENHAGEN:

The Third International Fisheries Trade Fair was held in Copenhagen from September 25-October 4, 1959. The number of visitors totaled 70,000, or about 10,000 more than the previous fair. There were many visitors from European and overseas countries. Sales effected at the fair were reported to be in excess of 200 million kroner (US\$29 million).

Exhibitors from several European countries as well as from Japan and the United States were represented. The American exhibitors included one Diesel engine firm of Peoria, Ill., a fork lift truck firm from Portland, Ore., a New Orleans, La., firm with shrimp processing machinery, and an outboard motor Company of West Bend, Wis.

The Fourth International Fisheries Trade Fair in Copenhagen is planned for 1962. (United States Embassy in Copenhagen, October 14, 1959.)

Note: Also see *Commercial Fisheries Review*, Sept. 1959, p. 51.



Egypt

FISHERIES TRENDS, OCTOBER 1959:

In February 1959, the Egyptian Government announced the establishment of a High Council for Fisheries to be headed by the Vice President, and to include representatives from the Ministries of Agriculture, Industry, Supply, Economy, and Coast Guard. The move was an attempt to coordinate the policies of these various ministries, each of which had some interest in fishery problems. It was expected that the Council would coordinate and develop plans for research and expansion of the Egyptian fishing industry.



The importance of fish in Ancient Egypt is shown by this model of the Nile God (Hapi) on which are fish, water fowl, and lotus flowers. Statue is in Agricultural Museum, Cairo. Original statue dates back to about 2,000 B. C.

The Government took a number of positive steps in 1959 to implement plans for the development of the fishing industry. It appears to have concentrated its efforts on improving the production of the inland-water fisheries.

Egypt (Contd.):

It has reopened the channels leading from Lakes Edkou and Monzalah to the sea. The decreased water salinity resulting from this action is expected to increase the catch in those two lakes, which provided about 35 percent of the total fishery landings in 1958.

Another step taken by the Government has been to grant, through the Agricultural Bank, loans to fishermen's cooperatives. These loans are expected to reach £E195,000 (US\$560,000) in 1959, and will probably be increased in 1960. By enabling the fishermen to obtain easier credit with which to buy boats, nets, and maintain their equipment, it is hoped catches will increase.

Further, the Government has continued to try to improve internal distributing facilities. During the past year it added a number of refrigerator trucks to transport fresh fish from Suez to Cairo.

During a part of 1958, four Yugoslav fishing vessels, under contract to the Egyptian Government, carried out exploratory and research work in Egyptian waters. Two of the vessels operated in the Red Sea and two in the Mediterranean. The latter finished their work early in 1959 while it is understood the former are continuing their operations. According to an official of the Hydrobiological Institute, the results have not yet been fully studied, although the prospects for significant catches of tuna in the Mediterranean area west of Alexandria to the Libyan border were reported as discouraging.

In March 1959, the Japanese fishing research vessel *Shoyo Maru* arrived in Alexandria. The vessel did work in the Mediterranean and Red Seas, with the principal object of discovering whether or not commercial catches of tuna might be found. Again, the results were disappointing in the Mediterranean, and only slightly less so in the Red Sea. It is believed that the failure of the Yugoslav and the Japanese vessels to find significant quantities of tuna has considerably dampened earlier hopes for

the establishment of a tuna fishing and processing industry.

Meanwhile, efforts appear to be concentrated on research being carried out, with Food and Agriculture Organization assistance, in the inland lakes. It is understood that the results of this research are much more promising.

There have been no significant developments of changes in the size or composition of Egypt's fishing fleet during 1959. The present fleet consists of approximately 485 small motor fishing vessels and probably about 1,500 small sailing vessels (excluding the inland lake boats). The total absence of larger trawlers, both for shrimp and fish, continues to be one of the principal factors limiting possibilities for significantly increasing the production of Egypt's ocean fishing industry.

In 1958 Egypt imported twice as much fish and fish products as she exported--imports £E389,316 (US\$1,118,000) and exports £E186,161 (US\$535,000). In previous years Egypt imported much larger quantities of fish and fish products (£E1,068,570 or about US\$3,069,000 in 1957). Egyptian exports, principally shrimp, have increased considerably, up from £E92,719 in 1957. Egypt is expected to continue to restrict imports and encourage exports of fishery products.

Aside from the Yugoslav and Japanese research assistance mentioned, the only countries known to have an active interest in the development of the Egyptian fishing industry, and these on a very small scale, are Greece and Japan. Greece has a small interest in the sponge fishing industry, and several private Greek interests in the past have expressed a willingness to participate in establishing fishing operations. Japan has shown an interest in assisting in the establishment of economically-feasible fishing operations and processing plants. Except for the possible establishment of a sardine canning factory which would use Japanese equipment and technical assistance, it is believed no other foreign investment plans exist. Whether foreign assistance remains

Egypt (Contd.):

confined to research, the provision of processing equipment and technical advice will depend to a large extent on the Egyptian Government's general policy regarding private foreign investment.

In addition to the sardine canning factory, it is believed the Government plans to increase the size of its Red Sea fishing fleet, and establish a number of small freezing and storage plants for the use of fishermen along the Red Sea and Gulf of Suez coasts. The plants will not be on a large scale. Another plan is to establish a shark-liver oil processing plant in the Red Sea. Even if these plans materialize in 1960, it is doubtful they will have much immediate effect on the country's fishing industry.

The prospects for any large increase in Egypt's over-all fish production in 1960 are not bright; however, inland water catches may increase somewhat. Any such increase will probably be consumed locally.

In the long run Egypt's fishing industry may have considerable potential. If more coordinated and intensive research indicates the existence of fish resources that lend themselves to commercial exploitation, the development of the industry will depend upon (1) the acquisition of modern efficient fishing vessels and the training of local fishermen in their use, and (2) the continued improvement of local distribution and processing facilities. From the point of view of foreign trade, the expansion of shrimp production would appear to be the most promising and should yield the highest returns. (United States Consulate in Alexandria, October 6, 1959.)



Ghana

UNITED STATES FISH CANNERY AND GHANA GOVERNMENT JOINTLY EXPLORING GULF OF GUINEA FOR TUNA:

A United States west coast canner and the African Republic of Ghana are jointly conducting fishery explorations in the Gulf of Guinea off central Africa. The objectives of the ex-

plorations are: (1) to assess the fishery resources of the coastal and high seas waters adjacent to Ghana; (2) to stimulate a new Ghana fishery for pelagic species if they are found to be available in sufficiently large concentrations; (3) to study the possibilities of establishing a tuna processing and freezing plant in Ghana; (4) to study the biological and oceanographic conditions existing in the waters of the Gulf of Guinea and along the shores of the Gold Coast.

The diet of the Ghana people consists mainly of fish and marine products as a source of protein. Beef is not raised in Ghana due to the lack of grasslands and the presence of the tsetse fly. As a consequence the six-million Ghanians in their diet rely very heavily on fishery products.

Unfortunately, the fishermen of Ghana cannot fulfill the growing requirements of the nation. Importation of fishery products is not practical from a financial standpoint. As a consequence more fishery development is needed within the country.

The Government of Ghana, in an effort to alleviate the present status, has teamed up with a United States fish canner. Together they will ascertain the potential of the coastal fisheries as well as the pelagic offshore stocks. From this arrangement Ghana will be able to learn more efficient means of catching fish. On the other hand, the United States canner also has an interest in the pelagic fishes of the Gold Coast. If the explorations disclose an abundance of tuna and tuna-bait fishes in the vicinity of Ghana, the canner will begin tuna fishing operations there. Some of the fish caught would supplement the local landings and the remainder will be shipped to the canner's new cannery being built in Puerto Rico. Eventually, the canner plans to build a cannery in Ghana.

The vessel employed for the explorations is the 220-ton capacity tuna clipper *Columbia*. Manned by a crew of eight United States fishermen and a fisheries scientist, the *Columbia* arrived in Ghana to commence operations on November 3, 1959. The remainder of the crew consists of five fishery technicians from the Ghana Fisheries Department. While exploring African waters for the next several months, the *Columbia* will sail from Takoradi, Ghana.

Throughout the cruise biological and oceanographic observations will be made in conjunction with fishing. Some of the scientific objectives are: (1) to study the salinity, temperature, current, and thermocline distribution within the Gulf of Guinea over a period of several months; (2) to further relate these oceanographic phenomenon with the distribution of various types of fishes; (3) to collect, identify, and study the distribution of inshore and pelagic fishes; (4) to contribute knowledge to the biology of the yellowfin and skipjack tunas. The studies will include food habits, growth rate, size composition of schools, population structure, and fecundity. A special effort will be made to collect larval tunas and find tuna spawning areas by means of plankton tows.



Honduras

REVISION OF FISHING LAW PLANNED:

As the result of certain clauses contained in the Honduran Law of Fishing, commercial fishing in Honduran waters by foreign vessels was virtually suspended during July 1959. On August 15, however, Acuerdo No. 1351 was issued by the Executive Branch of the Government of Honduras whereby the Minister of Natural Resources is given authority to consider and grant temporary permits to fish in spite of the restrictive clauses of the Law. This Acuerdo also stipulates

Honduras (Contd.):

that revision of the existing law is to be considered by the session of Congress which convened in November.

With a view towards acting upon this last stipulation of the Acuerdo, the Ministry of Natural Resources is drafting a revised Fishing Law and preparing the Regulations to the Fishing Law, states an October 19, 1959, dispatch from the United States Embassy at Tegucigalpa.



Hong Kong

FISHERIES TRENDS,
SECOND QUARTER 1959:

During the second quarter of 1959, Hong Kong marketing cooperatives handled 187,492 piculs (about 25.0 million pounds) of fresh marine fish and 23,712 piculs (about 3.2 million pounds) of salted fish landed. During the same period, 4,190 piculs (about 559,000 pounds) of shrimp were handled by the Fish Marketing Organization. The average price in the second quarter of 1959 for fresh fish was HK\$0.70 per catty (about 9.2 U. S. cents a pound).

Shrimp sales were not recorded by the marketing organization after June 17 as they were no longer eligible for the United States market. During 17-day period in June only 246 piculs (about 32,000 pounds) were sold. Widespread irregularities in exports to the United States were brought to light and the U. S. Treasury Department refused to approve further imports from Hong Kong pending establishment of a new certification procedure.

The Chinese Communists continued to harass fishing boats from Hong Kong when they left Hong Kong waters.

During a Legislative Council Budget debate the Deputy Colonial Secretary made some suggestions for improving the fishing fleet. In mentioning the lower landings in 1958, he suggested a new type of ocean-going trawler that could

fish in "safe" international waters and thus ensure continuity of supplies. Cost per boat would approximate HK\$500,000 (about US\$87,500). The only staple food in which Hong Kong is self-sufficient comes from its fishing fleet, the United States Consulate in Hong Kong reported on October 15, 1959.



Iceland

SOVIET UNION BUYS 2,800 TONS OF
ICELANDIC FROZEN FISH FILLETS:

On October 23, 1959, the Icelandic newspaper *Thjodviljinn* announced that the Soviet Union had agreed to purchase 2,800 metric tons of frozen fish fillets. The Ministry of Commerce had announced on August 6 that the Soviets were considering the purchase of 6,000 tons of frozen fillets to bring their purchases up to the 32,000 tons provided for in the trade agreement.

Although the Soviet purchases of frozen fish fillets are still 3,200 tons below the amount provided for in the trade agreement, the purchase of 2,800 tons should enable Iceland to close out its 3-year trade agreement with Russia on December 31 with payments about in balance.



India

TWO SMALL SHRIMP CANNERIES
IN OPERATION:

A small shrimp cannery in the fall of 1959 started to can shrimp in the small fishing village of Malpe, Mangalore, South Kanara, India. The equipment of the plant was designed and locally fabricated by its manager, a United States-educated fisheries engineer. The cannery at Malpe has an output of about 3,000 cans per 8-hour working day, and is the second cannery in operation in India.

A somewhat larger cannery, located at Cochin, started packing shrimp in September 1958 and its capacity is rated

India (Contd.):

at 12,000 cans per 12-hour working day.

Both of the canneries put together are expected to pack annually nearly 2 million cans, valued at about Rs. 3 million (US\$628,000) to the canners, for export to the United States. (The Bombay East Indian, October 1, 1959.)



Ireland

TERRITORIAL FISHING LIMITS TO BE MEASURED FROM BASE LINES INSTEAD OF SHORELINE:

The Eire Government has given notice that from January 1, 1960, the territorial fishing limits around the Irish coast will operate on the base-line system. This means that the limit line will be measured from base lines drawn from headland to headland and will not be measured from the shoreline.

However, Irish vessels will be permitted to fish the grounds excluded to non-Irish craft by the introduction of the system. Irish fishermen have been pressing for base-line limits.

The Eire Government, in a note explaining the reason for their action, stated that the old system gave rise to many difficulties. The new one would give the State jurisdiction over a greater sea area. (The Fishing News, October 23, 1959.)



Japan

AGREEMENT ON SAFE FISHING SIGNED WITH COMMUNIST CHINA:

The conclusion of a safe fishing agreement between the Japan-Communist China Fisheries Council and the China Fisheries Association was announced on October 29, 1959, in Peiping by a joint declaration of the two contracting parties. A Japanese member of the standing committee of the Japan-Communist China Fisheries Council, signed the agreement for the Japanese side.

The agreement designates two ports on the mainland, Lien Yün Kang and Wu Sung Kou, as ports of refuge for Japanese fishing boats in case of typhoon, shipwreck, accident, or sickness. The Japanese named the ports of Nagasaki, Tananoura, and Yamskawa. Severe restrictions are placed on the activities of Japanese boats and men while in Chinese Communist ports, and it is specified that the agreement does not apply to cases of sickness which are of an epidemic nature.

The Japan-Communist China Fisheries Council has applied to the Japanese's Maritime Safety Board of the Ministry of Transportation for official approval of the arrangement. In view of the fact that the agreement deals with humanitarian questions that are "non-political in nature," approval is expected in the near future. From a practical standpoint the Japanese consider the agreement to be advantageous, because their boats frequently fish in Communist China's coastal waters while few Chinese boats approach the shores of Japan, the American Embassy in Tokyo reported on November 1959.

BUILDING OF REPLACEMENT FISHING VESSELS STEPPED UP:

An increase in building of replacement fishing vessels in Japan is aiding that country's shipbuilding and related industries. Most of the new vessels are for tuna fishing. Due to the stabilization of the tuna industry, construction tonnage has increased to almost three times as much as previous years and shipyards and ironworks are said to be holding orders for the coming six months.

Compared with construction tonnage of 25,463 in 1958, by September 1959 it had reached 49,850 tons, almost twice as much. One reason for this increase in construction is the fact that a considerable amount of money is loaned out by financing institutions. Another reason is that many fishing vessels have reached both fishing companies and individual owners have shifted from offshore waters near Japan to distant fishing and direct exports or landings of catches of foreign ports or bases in the Atlantic.

Japan (Contd.):

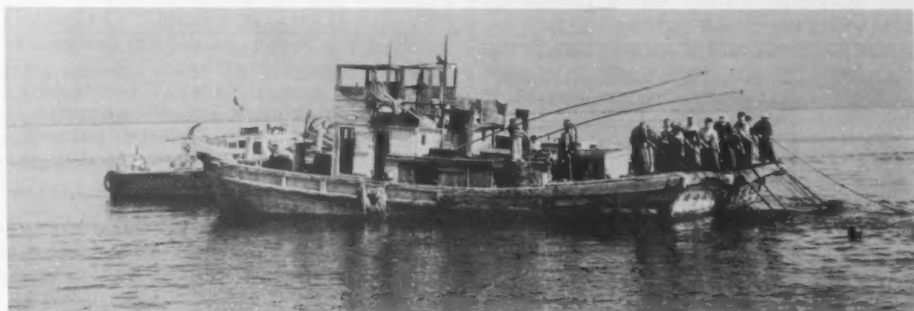
As far as the number of vessels is concerned, there does not seem to be much difference from 407 as of September 15, 1958, and 420 vessels as of September 1959. But while there was a drop of 34 wooden fishing vessels, there was an increase of 47 steel vessels in the first nine months of 1959. Each firm and vessel owner is trying to improve equipment and the efficiency of the fishing vessels, and at the same time a tendency is noticeable for building larger vessels. For instance, three

company's plans to expand its tuna fishery. After completion these vessels will be based at Misaki, Kanagawa Prefecture. (Fisheries Economic News, November 5, 1959.)

* * * * *

CANNED SALMON SALES TRENDS:

The Japanese Canned Salmon Sales Company commenced the second-period sale of canned salmon early in November 1959, and in addition to 225,000 cases of canned pink salmon, about 370,000 cases of red, silver, and chum salmon



Pelagic two-boating trawling near Shizuoka, Japan. Shows nets being hauled in.

firms are building tuna vessels of the 500-2,000 ton class. According to the shipyards, all the shipowners are trying to figure out how the fish hold can be made larger in order to utilize the ship's tonnage to the maximum. For this purpose, they are making the engineroom smaller and the weight of the main engine lighter. In the first nine months of 1959, vessels built or building for the skipjack tuna fishery totaled 123 as compared with 62 vessels built or building by September 15, 1958.

The Japanese Fishery Agency comments that the present condition does not necessarily indicate similar activities in 1960 and some quarters in the industry seem to be of the opinion that construction tonnage may be beginning to decrease. (Suisan Tsushin, October 30, 1959.)

One Japanese firm on November 5, 1959, was reported to have ordered two vessels of 480 tons each from a shipyard in Shizuoka Prefecture. Construction of these two vessels is part of the

were expected to be sold for export to Britain. Including those sold during the first period, the total sold to Britain in 1959 is estimated to be 1,100,000 cases.

Also, about 40,000 cases (tall cans) of pink salmon for the United States and some 110,000 cases for areas other than Britain, United States, and Canada were expected to be sold. With the 40,000 cases of tall cans and 250,000 cases of No. 2 cans, a total of 490,000 cases of canned pink salmon was sold to the United States. (Suisan Tsushin, November 4, 1959.)

* * * * *

EXPORTS OF SELECTED FISHERY PRODUCTS TO THE UNITED STATES, JANUARY-JUNE 1959:

During the first six months of 1959, Japanese exports of 37,300 metric tons of frozen tuna to the United States were valued at US\$10,531,000, an increase of 29.9 percent in quantity and 26.1 percent in value, as compared with the same period in 1958. Canned tuna exports (4,578

Japan (Contd.):

tons) to the United States January-June 1959 were valued at US\$4,614,000, a decrease of 47.5 percent in quantity and 35.2 percent in value from the first six months of 1958. Exports of other canned fish (mostly salmon and oysters) in January-June 1959 were up sharply (33.7 percent in quantity and 21.6 percent in value) from the same period in 1958. However, exports of fish and marine-animal oils were down 91.4 percent in quantity and 70.4 percent in value the first six months of 1959 from the same period of 1958. (United States Embassy, Tokyo, October 14, 1959.)

Japan's Exports of Selected Fishery Products to the United States, January-June 1959				
Item	Quantity		Value	
	January-June		January-June	
	1959	1958	1959	1958
	(Metric Tons)		(US\$1,000)	
Tuna, frozen . . .	37,300	28,708	10,531	8,348
Tuna, canned . . .	4,578	8,719	4,614	7,118
Crab meat, canned	1,794	1,293	4,366	2,928
Other canned . . .	13,148	9,837	9,779	8,042
Fish and marine animal oils . . .	779	9,068	962	3,248

* * * * *

MARINE-ANIMAL OIL EXPORTS, SUPPLY, AND UTILIZATION:

Exports: Japan's exports of edible marine-animal oils (fish-liver and whale oils) dropped only 2.3 percent from 1958 to 1959. However, exports of inedible marine-animal oils (sperm-whale oil) in 1959 of 11,000 metric tons were lower (33.2 percent) than the exports of 16,471 tons in 1958.

Supply and Utilization: During Japanese fiscal year 1959 (April 1959-March 1960), out of an estimated total supply of 177,670 metric tons of marine-animal oils (edible and inedible), 98,470 tons or 55.4 percent will be exported 41,900 tons will be used for industrial products, and 37,300 tons will be consumed in the manufacture of edible margarine and shortening. (United States Embassy dispatch from Tokyo, dated November 11, 1959.)

Table 2 - Japanese Estimated Utilization and Supply of Marine-Animal Oils, Fiscal Year 1959 (April 1959-March 1960)

Product	Margarine and Shortening	Industrial Use	Exports	Total
	(Metric Tons)			
Whale oil . . .	21,100	2,000	84,140	107,240
Fish oil . . .	16,200	15,600	3,160	34,960
Sperm-whale oil . . .	-	24,300	11,170	35,470
Total . . .	37,300	41,900	98,470	177,670

JAPANESE GOVERNMENT



Korea

FISHING INDUSTRY SUFFERS SEVERE DAMAGE FROM TYPHOON:

Typhoon Sarah swept across southern Korea on September 17, 1959, and left behind an estimated 669 persons missing and almost 800,000 persons homeless. Property damage, not yet all officially listed, is estimated to have exceeded US\$100 million.

Hardest hit was the Korean fishing industry which had been gradually developing under joint Republic of Korea-United States overseas mission (International Cooperation Administration) assistance to the point where it had become capable of supplying Korea's need for fisheries products and to provide a surplus for export.

United States fisheries technicians report that prior to 1959, a total of \$3,217,000 had been provided to rehabilitate the Korean fisheries program; and that current year's operations provide an additional \$480,000 in direct support from Defense Support Appropriations and \$659,000 from counterpart funds.

Estimated damage to fisheries installations in Kyong Sang Namdo Province, hardest hit by the typhoon, has been listed as at least 2,652,850,000 hwan (\$5,305,700). Because communications with many of the areas have not yet been re-established, this total loss may rise much higher. Two other provinces, less seriously affected, may bring the total loss to the fishing industry of Korea to \$18,000,000.

One major phase of the United States Aid program has been to assist the Ko-

Korea (Contd.):

rean Fisheries Associations to rebuild, remodel, or modernize the vessels in Korea's fishing fleet. On the basis of present information over 3,000 boats including 16 of the powered vessels which were replacing former craft were destroyed. Seven other powered vessels were lost, and 15 were partially destroyed. Vessels lost, damaged, or destroyed include many new craft built with USOM funds and on which the construction had been completed but the boats were awaiting the delivery of motors already in the warehouses.

Damages to Government facilities for fisheries research, demonstration, inspection, processing, and warehousing in the Pusan area amounted to 58,000,000 hwan (\$116,000) and much of this was constructed or operated as part of the fisheries program. An additional 24,000,000 hwan (\$48,000) was reported from various branch research stations and hatcheries in the Mokpo and other outlying areas.

Until September 17, 1959, the USOM fisheries program for Korea had expected to report unusual progress in implementing its current program. Typhoon Sarah has made it necessary for the Korean fishermen--and the United States aid program to the Korean fisheries industry--to make a fresh start. Already this is being done, with special survey teams in the disaster area to investigate what can be salvaged and to meet with the various fisheries guilds to help them develop ways to finance the reconstruction. Relief aid is already moving into the disaster area, and a formal request for long-range aid assistance has been forwarded to Washington, the United States Embassy in Seoul reported on October 21, 1959.

FISHING INDUSTRY EQUIPMENT LISTED FOR DUTY-FREE ENTRY:

The Korean Ministry of Finance issued two ordinances (Nos. 174 and 175) on October 20, 1959, which revised the existing provisions in Ordinances Nos. 54 and 55 for exemption of customs duties on certain imports. Public Notice No. 197 of October 20, 1959, issued by the Ministry of Finance spells out in de-

tail the specific machinery and equipment entitled to duty free treatment for each important and essential industry. Duty free items concerned with the fishing industry are as follows:

Equipment for Fishing Fleet: Fishing boats (50 gross tons up, under 5 years boat-age); fish detectors; direction finders; engines; whaling guns; net hoisters; fish pumps; and fishing nets (synthetic fibre products only).

Fish Canneries: Vacuum seaming machine; can washing machine; shell removing machine; filling machine; vacuum can inspecting machine; can drying machine; magnetic sterilizing machine; magnetic thermometers; can-lid making machine; and generators.

Agar-Agar Industry: Compressors; centrifugal separators; dryers; filtering machine; agar-agar packing machine; agar-agar cutters; and generators.

Fish Meal and Fish Oil Industry: Fish cooking machine; compressors; grinding machine; dryers; sieves; separators; distilling apparatus; electric current inducting and adjusting equipment; temperature regulator; and generators. (United States Embassy dispatch from Seoul reported November 3, 1959.)



Libya

TUNA LANDINGS UP FOR 1959 SEASON:

Landings of tuna at principal Libyan ports during the 1959 season totaled about 1,950 metric tons and the season was considered a successful one. The landings by ports are as follows: Zuara, 400 tons; Marsa Zunga, 280 tons; Zansur, 300 tons; Sidi Billiman, 420 tons; Kliton, 300 tons; and Misarata, 250 tons.

Additional supplies of tuna were received by a tuna canning company located in Zuara from Japanese tuna fishing vessels. These supplies enabled the cannery to extend its canning season for three months or until December. As a rule the Libyan coastal fishing season ends in August.

The tuna landed by the Japanese were smaller, but the meat was whiter and

Libya (Contd.):

the Zuara cannery believed the tuna packed from the Japanese fish would be attractive to the Americans in Libya. One problem remained unsolved regard-

tends to declare as having pioneer or protective status. The new list increases the number of industries likely to qualify from 31 to 34 and products from 174 to 189. Included in the list of products proposed for pioneer status are: Fish, includ-



Tuna fishing with set nets off coast of Libya. Net extends almost two miles from shore. Fishermen use barges first to put out a wire skeleton, held in position by anchors, and then fix the net over the wire. This takes 60 fishermen 2 to 3 weeks. Catches per haul vary from 12 to 500 tuna.

ing the landings of Japanese tuna--that is the customs duties to be assessed by the Director of Customs. (United States Embassy dispatch from Tripoli reported October 12, 1959.)



Malaya

**FISHERY AND WHALE PRODUCTS
PROPOSED FOR PIONEER STATUS:**

On October 1, 1959, the Malayan Federation promulgated its eighth notice of products and industries which the Minister of Commerce and Industry in-

ing crustacea, molluscs, cetacea (whales), and preparations thereof. (United States Embassy dispatch from Kuala Lumpur, October 6, 1959.)



Mexico

**EXPORT DUTIES ON FISHERY
PRODUCTS CHANGED EFFECTIVE
AUGUST 8, 1959:**

Export duties on some of Mexico's fishery products were reduced effective August 8, 1959 (announced in the Diario Oficial on August 4, 1959).

Mexico (Contd.):

Mexico's Export Duties on Fishery Products Effective August 8, 1959, with Comparisons							
Tariff No.	Product	NEW RATES			OLD RATES		
		Ad valorem	Specific		Ad valorem	Specific	
		%	Pesos Per Gross Kilo	US\$ Per Short Ton ²	%	Pesos Per Gross Kilo	US\$ Per Short Ton ²
040-00-02	Oysters in the shell	10	-	-	20	-	-
040-00-06	Tortoise shell turtles	10	-	-	20	3.00	218.00
040-00-99	Live animals, edible; from salt or fresh water, not specified	15	-	-	12	-	-
041-00-00	Fresh abalone whole, with or without shell	10	-	-	10	0.03	2.18
041-00-01	Fresh abalone fillets, refrigerated or frozen	5	-	-	8	-	-
041-00-03	Clams, without shell, fresh or refrigerated	5	-	-	10	0.03	2.18
041-00-09	Shrimp, fresh or refrigerated, from Gulf of Mexico	25	1/0.003	0.22	35	1/0.003	0.22
041-00-10	Shrimp, fresh or refrigerated, from the Pacific	25	1/0.003	0.22	35	1/0.003	0.22
041-00-13	Crayfish, "moro," fresh, refrigerated or frozen	10	-	-	10	0.03	2.18
041-00-14	Crayfish, other than "moro," fresh, refrigerated or frozen	10	-	-	10	0.03	2.18
041-00-19	Crabs, fresh, refrigerated or frozen	10	-	-	10	0.03	2.18
041-00-22	Lobster, fresh, refrigerated or frozen	10	-	-	10	0.03	2.18
041-00-27	Oysters, shucked, fresh, refrigerated or frozen	5	-	-	10	0.03	2.18
041-00-32	Goose barnacles, fresh, refrigerated or frozen	10	-	-	10	0.03	2.18
041-00-96	Crustaceans, not specified, fresh, refrigerated or frozen	15	-	-	20	0.03	2.18
041-00-97	Mollusks, not specified, fresh, refrigerated or frozen	15	-	-	20	0.03	2.18
041-00-98	Fresh-water fish, not specified, fresh, refrigerated or frozen	12	-	-	12	0.01	0.73
041-00-99	Salt-water, not specified, fresh, refrigerated or frozen	12	-	-	8	-	-
042-00-00	Abalone, salted	3	-	-	5	-	-
042-00-01	Clams, shucked, salted	3	-	-	5	-	-
042-00-02	Dried shrimp, peeled or not, even if pulverized	20	1/0.003	0.22	35	1/0.003	0.22
042-00-03	Oysters, shucked, salted	3	-	-	5	-	-
042-00-04	Octopus, salted	3	-	-	5	-	-
042-00-98	Crustaceans or mollusks, not specified, smoked, salted, in brine, or dry	5	-	-	10	-	-
042-00-99	Fish, not specified, smoked salted, in brine or dry	5	-	-	10	-	-
044-00-99	Fish sounds	10	-	-	15	-	-

1/ Listed in tariff as 0.30 pesos per 100 net kilograms.

2/ Equivalent in US\$.

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Mexico (Contd.):

EXPORT DUTIES INCREASED ON RED SNAPPERS, TURTLES, AND CRAYFISH:

The Mexican Government has increased export duties on red snapper, marine turtles, and fresh-water crayfish (*Diario Oficial*, October 21, 1959). In U. S. cents per gross pound the export duties now are about 1.2 cents for red snappers, 1.0 cent for turtles, and 2.8 cents for fresh-water crayfish.

The increases in duties were effected by increases in the official prices. It is not expected that these increases will have any appreciable effect on exports. In 1958 Mexico exported about 255 metric tons of red snapper, 32 tons of marine turtles, and one ton of fresh-water crayfish. All of these products were shipped to the United States.

* * * * *

MERIDA AREA SHRIMP FISHERY TRENDS, JULY-SEPTEMBER 1959:

Landings of shrimp from the Gulf of Mexico during the third quarter of 1959 in the Campeche-Ciudad del Carmen area exceeded the total catch of the second quarter by approximately 50 percent. A sudden drop in the price of shrimp in the Brownsville, Texas, market virtually eliminated the profits earned from this increase.

Table 1 - Landings of Shrimp at Carmen and Campeche, July-September 1959

Month	Carmen	Campeche
	.....(1,000 Lbs.).....	
July	844	291
August	848	338
September	1,397	302
Totals	3,089	931

The price drop was due largely to the high inventories in the United States. Heavy catches by United States vessels off the Texas coast added to the problem.

The new price level is actually not as low as it might seem, since prices have remained relatively high for the past two years. Previous to that, however, prices averaged about the same as September prices and lower.

Table 2 - Exports to U. S. of Selected Fishery Products from all Ports in the Merida Area, July-September, 1959

Product			
Shrimp	Frozen Fish	Shark Fins	Shark Skins
	.....(1,000 Lbs.).....		
4,026	578	4	18

The local effect of this change in the market has been to further reduce the number of marginal-profit boats operat-

ing in the Carmen-Campeche area. At present production levels, a fair profit may be earned even at the lower prices, provided that the operation is properly financed. However, in the Carmen area especially, many owners who entered the shrimp business during its highly profitable days backed by very little capital are finding it increasingly difficult to finance their operations. Forced to resort to excessively expensive credit facilities with interest rates as high as five percent per month, these owners suffer most from the reduced profit margin. In Campeche, however, the effect is not as severe since the majority of the shrimp boat owners are local business men whose financial situation is more stable and whose livelihood does not depend completely on the shrimp catches.

The increased volume of production on the Yucatan Peninsula during the July-September quarter had little or nothing to do with the self-imposed white shrimp ban along the Campeche coast for two months last spring. The catches during the last quarter were primarily pink and brown shrimp, although signs of a new crop of small white shrimp recently appeared.

On October 18, a group of Mexican Federal Government technicians were visiting Ciudad del Carmen as their first stop in a tour of the Yucatan Peninsula aimed at the study of the various problems of the regional economy. The group, which included representatives of several Government departments, made the investigation under the direction of the Secretariat of the President. Meetings were held in Carmen with representatives of the shrimp industry and it was reported certain recommendations concerning their difficulties will be made by the Government later. It appears that the executive branch of the Government may be taking more of an interest in the problems of the shrimp industry.

Shrimp production for the third quarter of 1959 totaled about 4.0 million pounds in the Carmen-Campeche area. The comparable figure for the previous quarter was 2.6 million pounds. (United States Consulate in Merida, October 23, 1959.)

* * * * *

SHRIMP FISHERIES TRENDS, OCTOBER 1959:

The Mexican shrimp fishing industry, particularly the vessel owners, in October 1959 were discouraged over the drop in shrimp prices. Reports from the Pa-



Fig. 1 - New shrimp trawler (built in November 1958) approaching dock at shipyard in Mazatlan, Sinaloa, Mexico.

cific Coast indicated a decline in white shrimp production for the Guaymas-Mazatlan fleets. During the latter part of October some of those vessels began fishing for brown shrimp, as fishermen

Mexico (Contd.):

believed that the season for white shrimp was over. Because of the size and price of brown shrimp, the vessel owners claimed to be losing money on catches of that species.

At the west coast port of Salina Cruz, catches began picking up towards the end of October with landings consisting mostly of brown shrimp. Boat owners complained of low prices. Trips yielding less than 4,000 or 5,000 pounds of headless shrimp were reported to be in the red. Three Salina Cruz vessels fishing off Guatemala were forced into San Jose, Guatemala, for alleged illegal fishing in Guatemalan waters on October 25, 1959.



Fig. 2 - Portion of shipyard at Mazatlan devoted to construction of steel vessels.

In the Carmen-Campeche area of the Gulf of Mexico landings averaged less than 2,000 pounds a trip in October. At Carmen during the first half of the month, about half of the landings were pink shrimp. Of the remaining half, white shrimp accounted for about twice as much as brown shrimp. The white shrimp picked up at the end of the month and were reported running ahead of the

pinks, with browns insignificant. Sizes were averaging about 50 percent 26-30 count to the pound or larger.



Fig. 3 - Small shipyard near Guaymas, Sonora, Mexico, showing three partially completed 66-foot wooden shrimp vessels.

At Campeche landings were about 95 percent pink with white accounting for most of the remainder. Sizes were running larger than at Carmen with better than 75 percent being 26-30 count or larger, the United States Embassy in Mexico City reported on November 6, 1959.



Morocco

FISHING VESSELS AND GEAR:

In 1959, according to statistics published by the Moroccan Bureau of Merchant Marine and Sea-Fishing, the fishing fleet consisted of 147 trawlers (average 56 tons), 312 sardine seiners (average 18 tons), and 2,120 small trawlers and line boats (average 3.4 tons). In addition to the fishing vessels, six tuna trap nets (madragues) operated on the Moroccan coast. At the two principal

Moroccan Fishing Vessels and Gear					
Port	Trawlers (Chalutiers et chalutiers-sardiniens)		Seiners (sardine fleet, sardiniens)		Small Trawlers and Line Boats (3.4 tons average, palanquiers)
	Number	Tons	Number	Tons	Number
Tanger	19	2,958	2	32	70
Khenitra (ex Port Lyautey)	5	246	1	6	99
Rabat	2	94	3	37	73
Mohammedia (ex-Fedale)	1	12	10	95	101
Casablanca	42	2,078	54	702	202
El Jadida (ex-Mazagan) .	-	-	7	68	168
Safi	35	1,252	93	2,332	266
Essaouira (ex-Mogador)	3	118	13	270	197
Agadir	29	1,002	116	1,870	799
Larache	11	465	13	279	145
Totals	147	8,225	312	5,691	2,120

Morocco (Contd.):

sardine fishing ports of Safi and Agadir, nylon twine is being used more frequently in the seine nets. (United States Consul in Casablanca, October 5, 1959.)

* * * * *

SARDINE FISHERY TRENDS, THIRD QUARTER 1959:

Marketing Moroccan canned sardines continues to be a matter of selling at a profit in France at 5,800 to 6,200 French francs (about US\$11.81-12.63) per case and at a loss elsewhere at about 3,000 Moroccan francs (about US\$7.14) per case. Canners seem now to be coming to terms with reality and are curtailing production to the approximate size of the French duty-free quota of 600,000 cases. In doing so, they face the opposition of the Government, which wishes to keep Moroccan sardines on the world market. The canners and the Government have settled upon a compromise of 1,300,000 cases, which, added to the 650,000 cases left over from the 1958 season, make 1,950,000 cases to be sold, more than two-thirds of which will probably have to be sold at a loss. No effective measures have been taken to reduce the high cost price of Moroccan sardines in order to bring it down to a competitive level. At the beginning of September 1959, only 40 factories were active and many were canning mostly mackerel, which is salable abroad.

According to a Casablanca commercial newspaper, a price of 3,500 francs (about US\$8.33) per case has been offered by Soviet Russia but with "conditions fixed by the buyers which partly nullify the additional value offered."

The dispute between the fishermen and the fish meal and oil industry about the price of sardines has not yet been settled. It had been agreed that the price of sardines for byproducts factories would rise during the season from 8 to 11 francs per kilo (0.86-1.2 U. S. cents a pound or \$17-24 a short ton). The factory owners later backed down on the agreement, due to the decline in prices for fish meal on the world market. The matter is now in the hands of

the Ministry for Industry, and fish are being sold for 9 francs a kilo (about 0.97 U. S. cents a pound or \$19 a short ton).

The fish meal industry has grown considerably in the past two years due partly to the closing of many canneries, and considerable investments have been made in equipping some 7 or 8 new plants, the United States Embassy in Rabat reported on October 20, 1959.

Note: Moroccan franc valued at 420 francs to US\$1 and French franc at 491 francs equal US\$1.



Netherlands

ANTARCTIC WHALING FLEET DEPARTS AFTER SETTLEMENT OF DISPUTE OVER WAGES:

The wage dispute between the Union for Seamen and the Netherlands Whaling Company, which threatened to delay the departure of the factoryship Willem Barendsz and its fleet of catcher vessels to the Antarctic whaling grounds, has been settled for the 1959/60 season. The old labor agreement has been extended for this coming season. Wages were not lowered as was the original intention of the Company and agreement was reached concerning the premium to be paid the seamen on the basis of the whale oil produced. Earlier in 1959 the Dutch Whaling Company, in anticipation of a lower blue-whale unit quota, had announced its intention of seeking a new agreement with the seamen for lower wage levels. As the Netherlands is now no longer bound by the International Whaling Commission quota, the Company plans to increase the whale catch from about 700 blue-whale units to 1,200 blue-whale units.

The Willem Barendsz was delayed in sailing on the scheduled date of October 31 due to a delay in completing the installation of a new deep-freezing unit. However, the whaling fleet was reported to have left on November 4 and was expected to arrive on the Antarctic whaling grounds in time to operate the full 107 days as scheduled. (United States Embassy in Amsterdam reported on October 23, 1959.)

Note: Also see Commercial Fisheries Review, December, p. 91.

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Netherlands (Contd.):

IMPORTS OF MARINE OILS,
JANUARY-JUNE 1959:

During the first six months of 1959, imports of marine oils (include oils produced at sea by Dutch fishing and

whaling fleets) amounted to 35,599 metric tons, an increase of 46.1 percent as compared with the 24,366 tons imported in the same period of 1958. Values were up about 33.7 percent in the first six months of 1959 from January-June 1958. The approximate value per metric ton for imported marine oils declined from about US\$217.27 in the first half of 1958 to about 195.79 per ton in January-June 1959. (Report of October 3, 1959, from Agricultural Attache with U. S. Embassy, the Hague.)

Netherlands Imports of Marine Oils, January-June 1958-59				
Country of Origin	January-June 1959		January-June 1958	
	Quantity	Value ¹	Quantity	Value ¹
	Metric Tons	US\$ 1,000	Metric Tons	US\$ 1,000
United States . . .	5,318	929	2,382	444
United Kingdom . .	-	-	256	60
West Germany . . .	863	153	1,263	266
Iceland	3,777	734	187	42
Norway	2,261	482	309	89
Portugal	332	44	256	41
Union of South Africa	-	-	282	66
Peru	495	73	150	28
Falkland Islands . .	3,462	695	542	94
Japan	1,308	327	9	3/2
Sea 2/	16,710	3,324	18,038	3,913
Other	1,073	209	692	169
Total	35,599	6,970	24,366	5,214

¹ Values converted at rate of 3.775 guilders equal US\$1.

² Represents fish and whale oil production by Dutch fishing and whaling fleets.

³ Value estimated

Norway

EXPORTS OF MARINE
PRODUCTS, 1957-58:

Norwegian exports (includes products delivered directly from fishing grounds) of fishery and marine-animal products during 1958 amounted to 632,770 metric tons, valued at US\$165.2 million. As compared with 1957, the exports in 1958 were lower by 12.7 percent in quantity and 11.5 percent in value. The decline in Norway's exports of fish and fish and marine-animal byproducts was due largely to the failure of the 1958 winter herring fishery. Products derived directly from the herring fishery (exclusive

Norway's Exports of Marine Products, 1957-58

Product	1958			1957	
	Quantity	Value		Quantity	Value
	Metric Tons	1,000 Kroner	US\$1,000	Metric Tons	US\$1,000
Fresh Fish:					
Herring	30,080	14,377	2,014	57,138	3,839
Fillets	1,242	2,925	410	316	100
Other fish	26,984	49,112	6,878	26,375	6,417
Total fresh fish	58,306	66,414	9,302	83,829	10,356
Frozen Fish:					
Herring	34,484	22,499	3,151	45,686	4,009
Whole fish	14,933	37,999	5,322	7,872	4,152
Fillets	18,038	51,926	7,273	17,318	6,237
Total frozen fish	67,455	112,424	15,746	70,876	14,398
Dried, Salted, and Smoked:					
Stockfish (dried)	37,551	71,762	24,056	36,040	21,772
Klipfish (salted and dried)	33,467	108,201	15,154	42,193	20,058
Herring (salted)	60,263	57,936	8,114	62,883	8,381
Fish (salted)	13,957	23,255	3,257	9,942	2,324
Herring (salted and smoked)	3,864	5,866	822	4,004	833
Cod roe (salted)	1,747	2,020	283	1,387	239
Total dried, salted, and smoked	150,849	369,040	51,686	156,449	53,607
Shellfish	2,880	30,995	4,341	2,897	4,034
Canned fish (all kinds)	39,133	155,906	21,836	42,881	24,284
Fish and Whale Meal:					
Herring meal	89,437	102,976	14,422	120,468	20,005
Fish meal, ground fish	16,527	16,032	2,245	14,231	1,921
Sea weed meal	6,360	2,495	349	7,342	415
Fish liver meal	1,025	1,061	149	920	139
Whale meal	7,810	7,190	1,007	10,106	1,285
Total fish and whale meals	121,159	129,754	18,172	153,067	23,765
Fish oils and fish-liver oils	134,999	202,174	28,316	141,697	34,166
Refined hardened oils and fats, inedible and edible	57,989	112,739	15,790	72,988	21,941
Totals	632,770	1,179,446	165,189	724,684	186,551

Norway (Contd.):

of herring oil and herring oil refined into hardened oils and fats) declined from 290,169 tons in 1957 to 218,128 tons in 1958, or about 24.8 percent.



Pakistan

NEW WHOLESALE FISH MARKET AT KARACHI OPENED BY PRESIDENT:

On October 2, 1959, the New Karachi wholesale fish market was opened by the President of Pakistan. The Minister of Food and Agriculture made the introductory speech in which he outlined the status of the fish harbor and revealed for the first time publicly the Martial Law Regulation which had been signed on September 29, 1959, whereby no one is permitted to sell or otherwise dispose of fish, fresh, dried, or salted, except at places designated by the Central Government. This provision of the Martial Law applies only to wholesale auctions. Retail sales and sales by hawkers will be unaffected. After the Minister's speech, the President's speech emphasized mostly the food and nutritional value of fish and the necessity for developing fisheries as a means of increasing food supply.

The President then went out into the sorting room of the wholesale market. In the undredged channel there were several small gaily decorated fishing boats which could navigate the channel, and it had been arranged that one fishing vessel would tie up alongside and discharge its cargo which in turn would be sorted. The President watched the unloading and sorting, inspected the weighing system, and departed. The market was officially open.

The market did not actually start auction operations until October 6, at which time 60 metric tons of fish were disposed of. The quantity has increased, and on October 9, 140 tons were sold of which about half were fresh and the other cured or processed. The daily capacity had been estimated at 120 tons.

The channel at the waterside where fishing boats were to land their catch has not been dredged to sufficient depths and catches continue to be landed elsewhere and brought into the market by camels, rickshaws, and trucks, so that the planned smooth flow from the ships to the sorting room and into the auction room has not yet been effected.

The Government has stated that the fish harbor will be in full operation by the middle of 1960. Following is the status of the installations in the fish harbor, and the anticipated date of completion as set forth by the Government: Jetty built on the reclaimed land completed; wholesale fish market, completed; oil pier, completed; Fishermen's Cafe, completed; building for storing, display, and sale of fishing equipment, completed; four sheds to be used for making and mending nets as well as the fishermen's rest house, completed; the sea food cafe, construction completed but not open pending a decision as to who will operate; two cold storage plants, 120 tons each, completed; one chip-ice plant and 2 block-ice plants with combined capacity for freezing 40 tons a day, completed; research station (marine fisheries laboratory), January 1960; dredging, April 1960; boat basin, workshop, and slipway for repair of vessels, no estimated date of completion but construction will not begin until after dredging has been completed; curing yard, no estimated date of completion but construction is to begin early in 1960. Private enterprise area, 37,000 square yards have been earmarked for private industry and 7 plots have been allotted. Construction has started on one freezing plant. No date of completion indicated. The other 3 freezing plants, the 2 canning plants, and 1 shark-liver plant are just now placing orders for machinery; and road network, the major portion of network completed.

The Martial Law Regulation No. 75 promulgated at the time of the opening reads as follows:

"No person shall sell or otherwise dispose of, within the Federal Capital, fish whether fresh, dried or salted except at such place or places and in such manner as the Central Government may from time to time by notification in the official Gazette direct. . . ."

Pakistan (Contd.):

Under this regulation only the Karachi Fish Harbor, West Wharf, has been designated as the place for disposing of fish.

Official press handout hails this regulation as a welfare measure for the general fishing community and the consuming public by breaking the monopoly of the 11 auctioneers known as "moleholders" and who are said to "resort to malpractices of various sorts," so that "the fishermen do not get an adequate return for the labor involved in sea fishing." It also is touted as a means of increasing the foreign exchange earnings of the country by preventing the wastage of fish in transit and in handling as well as by improving the quality of processed fish. (United States Embassy report, Karachi, October 16, 1959.)



Peru

NEW LAW MODIFIES RESTRICTIONS ON EXPANSION OF FISH MEAL PLANTS:

The Peruvian Supreme Resolution No. 217 of December 1, 1956, which prohibited the establishment of new fish meal plants or the expansion of existing plants, has been superseded by Supreme Decree No. 09 of October 9, 1959.

At the same time, the Decree also modified Article 25 of Supreme Decree No. 12 of December 5, 1958, in such a way as to impose certain limitations upon the establishment or expansion of plants. Under the Decree of October 9, 1959, licenses will be issued only for land installations and for plants whose capacities do not exceed those of existing plants. Applications will be accepted only from individuals or entities having sufficient economic means to complete a project, and they must own their own fishing vessels. Licenses will not be issued for the operation of new plants in three specified zones, and closed seasons will be established by the Ministry of Agriculture as necessary for conservation. There are other provisions re-

lating to the use of licenses within one year of issuance, and to inspection.

Plants already in operation have 12 months from date of publication of the October Decree in which to bring their operations into accord with the Decree. Licenses limit tonnage to that which can be processed in 20 hours a day and 300 days a year.

In regard to the requirement that plant operators must own their own vessels, vessels normally engaged in supplying fresh fish for consumption, freezing, or canning have been diverted to anchovy fishing, causing a severe shortage in the supplies of edible fish. The vessel ownership requirement is designed to correct the shortage of fresh fish by preventing diversion of boats to the presently more lucrative fishery for the reduction plants. (United States Embassy reported from Lima on October 19, 1959.)

Note: Also see *Commercial Fisheries Review*, December 1959, p. 95.



Portugal

CANNED FISH EXPORTS, JANUARY-JULY 1959:

Portugal's exports of canned fish during January-July 1959, amounted to 38,605 metric tons (2,117,000 cases), valued at US\$19.8 million as compared with 32,868 tons, valued at US\$17.7 million for the same period in 1958. Sardines in olive oil exported during the first seven months of 1959 amounted to 27,858 tons, valued at US\$13.5.

Portuguese Canned Fish Exports, January-July 1959		
Species	January-July 1959	
	Metric Tons	US\$
Sardines in olive oil	27,853	13,485
Sardine & sardinelike fish in brine	1,072	216
Tuna & tunalike fish in olive oil .	1,965	1,400
Anchovy fillets	3,790	2,843
Mackerel in olive oil	2,391	1,179
Other fish	1,529	702
Total	38,605	19,835

During January-July 1959, the leading canned fish buyer was Germany with 8,506 tons (valued at US\$4.2 million), followed by Italy with 5,385 tons (valued at US\$3.1 million), United States with

Portugal (Contd.):

3,614 tons (valued at US\$2.5 million), Great Britain with 3,426 tons (valued at US\$1.6 million), and Belgium-Luxembourg with 2,540 tons (valued at US\$1.2 million). Exports to the United States included 1,585 tons of anchovies, 406 tons of tuna, 1,536 tons of sardines, and 28 tons of mackerel. (Conservas de Peixe, September 1959.)

CANNED FISH PACK,
JANUARY-JULY 1959:

The total pack of canned fish for January-July 1959 amounted to 17,679 metric tons as compared with 17,849 tons for the same period in 1958. Canned sardines in oil (9,257 tons) accounted for 52.4 percent of the January-July 1959 total pack, up by 1.0 percent from the pack of 9,164 tons for the same period of 1958, the September 1959 Conservas de Peixe reports.

Portuguese Canned Fish Pack, January-July 1959		
Product	Net Weight	Cases
	Metric Tons	1,000
<u>In Olive Oil:</u>		
Sardines	9,257	487
Sardinelike fish	504	26
Anchovy fillets	3,655	365
Tuna	3,345	119
Mackerel	306	12
Other species	612	32
Total	17,679	1,041

FISHERIES TRENDS,
JANUARY-JULY 1959:

Sardine Fishing: During January-July 1959, the Portuguese fishing fleet landed 28,440 metric tons of sardines (valued at US\$2,983,756 ex-vessel or about \$104.90 a ton).

July 1959 landings of sardines totaled 11,353 tons valued at US\$1,288,174. Canneries purchased 53.2 percent or 6,040 tons of the sardines (valued at US\$693,217 ex-vessel or about \$114.77 a ton). A total of 5,276 tons was purchased for the fresh fish market, and 37 tons were salted.

Other Fishing: The January-July 1959 landings of fish other than sardines were principally 16,044 tons of chin-

chards (value US\$1,093,495) and 3,015 tons of anchovies (value US\$275,061). (Conservas de Peixe, September 1959.)



South-West Africa

FISHING INDUSTRY
IMPORTANT TO ECONOMIC LIFE:

The South-West Africa fishing industry, centered around Walvis Bay and Lüderitz, has grown rapidly and makes a significant contribution to the Territory's economic life. It brings in over US\$25 million worth of business a year and employs some 4,000 persons. Six modern canneries and freezing plants permit efficient production of canned pilchards (sardine), fish oil, and fish meal.

South-West Africa's Production of Selected Products and Byproducts and White Fish Landings, 1957-58

	1958	1957
	. . . (Short Tons) . . .	
Pilchards:		
Canned	56,422	42,838
Fish meal	46,200	46,768
Fish oil	12,381	10,793
Spiny lobster	. . . (1,000 Lbs.) . . .	
Canned	430	1,808
Frozen tails	1,777	1,374
Fish meal	1,882	3,698
Landings of white fish	6,620	10,383

In 1959 the permissible pilchard-masbanker catch was increased by 50,000 tons to 300,000 short tons. This bodes well for the industry because there has been greater demand for fish meal and oil as well as for canned fish. Competition from the United States and Japan has been keen, however, particularly for canned fish in the Philippine market. Although canned spiny lobster production has fallen off, the United States market for frozen spiny lobster tails has kept the spiny lobster industry healthy and it has processed about 20 million pounds a year. (Canadian Foreign Trade, November 7, 1959.)

NEW VESSEL FOR
SPINY LOBSTER RESEARCH BUILT:

A 74-foot vessel (similar to the Trachurus and Kunene built for the Union of South Africa Fisheries Divisions)

South-West Africa (Contd.):

has been built at Luderitz for the South-West Africa Administration for spiny lobster research.

Luderitz, one of South-West Africa's two fishing centers, has six large spiny lobster processing factories representing a capital investment of about US\$8.4 million. More than 1,000 fishermen and factory workers are dependent on the industry and during the past few years have suffered as a result of a sharp drop in the yearly catch. The Administration has a laboratory and three scientists in the town, but its only available vessel has been the 65-foot patrol boat Nautilus II.

The head of the Fisheries Section of the South-West Africa Administration said that the new vessel, which was to be named Angra Pequena, would cost about \$112,000 to build and equip. She would be powered by twin Diesel engines each developing 170 hp., and, like the other South-West Africa fishery research vessels, would be a twin-screw craft. She would have a speed of at least 11 knots. In addition to a large laboratory, she would have accommodations for 13 crew and scientists.

In addition to its proposed work on spiny lobsters, the South-West African Administration is making a substantial contribution to pilchard research with two modern vessels, the 82-foot Namib and the 70-foot Kuiseb, and a team of seven scientists.

Another project being undertaken by the Administration is the building, at a cost of \$98,000-\$112,000, of new laboratories at Walvis Bay. (The Australian Fishery Newsletter, September 1959.)



Spain

CANNED TUNA EXPORTS TO UNITED STATES INCREASE SHARPLY:

Since the inauguration of the new exchange rate on July 22, 1959, there has

been a sharp increase in exports of canned albacore tuna from Spain to the United States. From July 22-August 31, 1959, a total of 1,345,685 pounds (value US\$489,403) of canned albacore tuna and 58,918 pounds (value \$22,014) of other canned fish were exported to the United States. Total exports in 1958 to the United States of all types of canned fish amounted to 1,757,572 pounds, valued at US\$556,456.

Two factors are believed to have contributed to increased exports to the United States during July and August 1959. First, and believed to be of primary importance, is the adjustment in the exchange rate of 60 pesetas to the dollar. Previously canned fish exporters had been allowed premiums of up to 8 pesetas on the official rate of 42 pesetas to the dollar, bringing the previous effective rate up to a maximum of 50 pesetas to the dollar.

The second factor mentioned as a boost to export sales is the poor catches of summer albacore tuna by the Japanese fishermen which resulted in decreased exports by Japan of canned white meat tuna to the United States.

Spanish fish canners were optimistic over prospects for exports during the remainder of 1959, although their optimism was based primarily on the hope that albacore catches would continue to be plentiful. Sales to the United States of canned fish exceeding US\$1 million are forecast for the year 1959.

In commenting on the monetary stabilization program, one canner stated his belief that the program will be successful in the long run, and cited the increased exports of canned fish as evidence of short-run success in one sector. He added that the program must work, if industries such as fish canning are to survive. (United States Consulate in Vigo, reported September 11, 1959.)



Sweden

EXPORTS OF FISHERY PRODUCTS TO EAST GERMANY RESUMED:

Negotiations between officials of the Swedish West Coast Fishermen's Organization and East German authorities have resulted in the resumption of Swedish fish exports to East Germany. First shipments, it is said, will consist of deliveries from the 4,500 metric tons (about 100,000 cases) of herring stored in plants in southern and western Sweden. Later it is hoped to export fresh fish.

It is reported in the Goteborg press that the agreement provides that during the remainder of 1959, Sweden will be able to export 6,315 metric tons of fish (herring, eel, cod fillets, salmon, etc.) to East Germany as well as 1,825,000 cans of sprat and 100 metric tons of specialities for a total value of 6,500,000 crowns (US\$1,257,000). This amount will be in addition to the 9 million crowns (US\$1,740,000) provided for in the 1959 barter agreement with East Germany, according to an October 27, 1959, dispatch from the United States consul in Goteborg.

Note: Also see Commercial Fisheries Review, December 1959, p. 97.



Taiwan

FISHERY LANDINGS INCREASED IN 1958:

Salt-water and pond fish production by Taiwan in 1958 amounted to 229,667 metric tons--10.3 percent above 1957. The goal for 1959 is 242,000 metric tons. It was reported recently that production through July 1959 reached 136,045 tons and, despite flood damage to fish ponds, the 1959 production is expected to exceed the target.

Flood damage to fisheries was estimated officially at NT\$76,375,000 (about US\$2,117,000), almost all of which consisted of claimed damage to fresh-water ponds and to brackish coastal ponds near Tainan. A fisheries expert in September reported that the few fresh-water ponds in the flooded area had been repaired and restocked, at a total outlay to the Federal Agency of less than NT\$4

million (US\$111,000), and that most of the coastal ponds were better left unrepaired, since they obstruct drainage and are illegal. Thus, pond-fishery production has been little set back, and the abundance of water for ponds around Taoyuan, which frequently go dry in late summer, will probably assure an increased catch there. Certain funds were made available for rehabilitation of boats and fishing harbors.

Taiwan's fishing has expanded so fast that coastal and inshore trawling grounds are becoming less profitable, and the trawlers are tempted to wander afield. They stray occasionally within reach of Communist Chinese gunboats and are taken into custody. Though they are usually released, the Government has attempted to minimize incidents by setting limits to those parts of the Taiwan Strait and China Sea in which they can operate. The trawlers have regularly ignored the limits but, after the most recent incident last spring, the Navy began more rigid enforcement, and the trawlers have complained to the authorities that, unless restrictions are relaxed, the offshore and deep-sea fishery catch will shortly begin to decline. (United States Embassy dispatch from Taipei, October 22, 1959.)



Thailand

SHRIMP INDUSTRY BEING DEVELOPED:

The first shipment of frozen shrimp from Thailand to the United States took place in April 1959. The packer, with headquarters in Bangkok, has a complete processing and packing plant located in the Government freezer there. The facility offers a holding capacity of 3,500 tons. The one company is the only packer operating in the Government warehouse at present. The initial shipment of shrimp (packed in 5-pound cartons) was the first frozen product ever shipped from Thailand.

The Thailand packer expects to pack about 500,000 pounds during its first year of operation. It supplies fishermen with nets, and has secured services of Japanese technicians to teach native fish-

Thailand (Contd.):

ermen how to fish for shrimp with modern equipment.

The packer obtains mostly white shrimp, but has secured some tiger-stripe shrimp. Most of the catch has been jumbo size with very little smaller than 10-to-the-pound. The fishing season usually lasts about nine months. (Frosted Food Field, October 1959.)



Tunisia

FISHERY TRENDS, OCTOBER 1959:

In July 1959, the Director of the Tunisian Office National de Peche visited Italy where he arranged for the purchase of two used trawlers. He also concluded final construction details on 4 new trawlers being built in Italy as a part of the United States aid program to Tunisia. Two of these are to be delivered in February 1960 and two more in March. Two additional used trawlers may be purchased in Italy. The dinar-franc disparity continues to plague the Tunisian fishing industry which is also affected by Portuguese, Spanish, Japanese, and even Moroccan competition.

Tuna landings during the 1959 season, which ended in mid-July, were abnormally small. Only 200 metric tons were landed as compared to average annual landings of 1,000 tons. The light landings in 1959 may be attributed to any one or a combination of the following factors: nonappearance of tuna in Tunisian waters; depletion of tuna schools in the Mediterranean as the result of overfishing, and the fact that only two Spanish captains were available to set the fish traps for the Sidi-Daoud tuna canneries, Tunisia's largest. The Spaniards have been replaced by less experienced Tunisian trap captains.

The catch of sardines and sardine-like fish for the season which begins in late May and ends in November was poor as of early October. It is reported that price-wise Tunisia can now export to the French market, but that the

quality of Tunisian sardines is poor and French buyers are offering sales resistance. The principal reason for this is the poor handling techniques of the Tunisian fishermen, the fact that refrigeration is generally unavailable, and fish are delivered to the canneries in poor condition. However, it has been noted that total exports of salted and canned fish and shellfish increased about 21.6 percent during the first half of 1959 (264,706 dinars or about US\$630,000) as compared to the similar period of 1958 (217,696 dinars or about US\$518,000). (United States Embassy dispatch from Tunis, October 16, 1959.)



Turkey

PLAN TO ACTIVATE FISH MEAL AND OIL PLANT IN 1960:

The Turkish Meat and Fish Organization established Turkey's first fish meal and oil plant in Trabzon in 1958 and planned to begin operations in the 1958 season. The plant building and installation of machinery was actually completed, but activation has been delayed. Now the Meat and Fish administrators are planning to put the plant into operation early in 1960. This plant will produce industrial fish oil and fish meal. The main types of fish utilized will be porpoise and mackerel.

A small amount of fish oil is produced with primitive methods by the fishermen of the eastern Black Sea region. When they catch a porpoise, they boil it, skim off the oil, and use the meat scrap as fertilizer, as they have no fish meal reduction equipment, according to an October 6, 1959, report from the United States Agricultural Attache in Ankara.



Union of South Africa

PILCHARD-MAASBANKER LANDINGS FOR 1959 BREAK RECORD:

The 1959 pelagic shoal fishing season off the Union of South Africa's Cape west

Union of South Africa (Contd.):

coast closed at midnight on August 14, 1959, with a new record catch of 34,753 short tons, made up of 286,796 tons of pilchards, 19,484 tons of maasbanker, and 36,473 tons of mackerel. This catch was higher than that of the previous record season in 1952, and exceeded the 1958 catch substantially.

The decision to close the 1959 season two weeks before the expected closing date of August 31 was made on the recommendation of the Fisheries Development Advisory Council which met at the end of July. At this meeting the Council was informed by the Union's Director of Fisheries that the pilchard-maasbanker quota had already passed the 276,723 tons landed to the end of August last year. Almost the entire pilchard catch, he reported, had been taken from the area south of Cape Town; smaller fish were being caught and the pilchards were showing signs of early spawning.

On August 14, the notice closing the season was published in the Government Gazette. This closed the Cape West Coast to the catching of pilchards and maasbanker for canneries or fish meal plants for the period August 15 to December 31. Plants were being overhauled and refitted late in 1959 in preparation for the next season which was due to start in January 1960.

An outstanding feature of the 1959 season was the huge pilchard catch of 286,796 tons, more than the previous record of 214,533 tons set in 1958. The mackerel catch of 36,473 tons was also a record. But maasbanker landings of 19,484 tons were the lowest since 1947 when the industry had only just entered its period of intensive development.

Products produced from the Union of South Africa shoal fish landings were 71,505 tons fish meal, 3,592,482 Imperial gallons fish oil, 925,000 pounds canned pilchards, 6,923,371 pounds canned maasbanker, and 12,781,276 pounds canned mackerel.

In 1957 and 1958 maasbanker landings were boosted by brief periods of heavy catching. In 1959, however, there was no

maasbanker run, although boats moving between St Helena Bay and the Cape Peninsula fishing waters kept a close watch for the shoals.

Another feature of the season was the appearance of Hout Bay as a shoal fishing center. Its proximity to the best fishing areas proved extremely advantageous to its 2 fish meal factories which, with a reduction plant capacity of only 15 tons of raw fish an hour, handled some 20 percent of the quota fish catch. The 2 Saldanha Bay factories, also reasonably well placed, handled about 20 percent of the catch; 7 large factories on the southern shores of St. Helena Bay processed 55 percent and 5 percent was handled by the factories at Lambert's Bay and Thorn Bay.

It is estimated that 95 percent of the pilchard catch was taken from the waters south of Cape Town by a fleet of 150 boats, most of which had to travel several hours to and from the fishing area.

In 1959, for the first time, the Division of Fisheries attempted a forecast of the pilchard catch. The forecast was exceeded by 50,000 tons. The estimate was, however, based on one instead of three months' autumn temperature observations; and the low maasbanker catch with subsequent concentration on pilchards was an unexpected factor. According to the Fisheries Division, temperature observations made during the autumn of 1959 indicate a "reasonably good season" in 1960. The Division is now analyzing its observations and hopes to give a more detailed forecast of the 1960 catch.

With the big catch of pelagic shoal fish in Cape waters and likely landings at South-West Africa's Walvis Bay of 300,000 short tons, fish landings in the Union and South-West Africa are almost certain to be the highest ever. The pelagic shoal fish catch will alone exceed 630,000 tons; the indications are that trawl fish landings will again pass 100,000 tons; and line fishing, including a good catch of snoek, should add another 40,000 tons to bring the total to more than 770,000 tons--56,000 tons above the record 714,000 tons of 1958. (The South African Shipping News and Fishing Industry Review, September 1959.)

Union of South Africa and South-West Africa

PILCHARD-MAASBANKER FISHERY TRENDS, JULY AND AUGUST 1959:

During July 1959, South African west coast fishing vessels landed more pilchards than in any other single month in the history of the fishery. According to the Division of Fisheries, the Union of South Africa July pilchard landings were 65,175 short tons, more than 10,000 tons higher than the previous record set in June 1959. In addition, 104 tons of maasbanker and 48 tons of mackerel were landed in July 1959. These figures compare with 25,613 tons of pilchards, 1,109 tons of maasbanker, and 1,151 tons of mackerel caught in July 1958; and with 1,911 tons of pilchards and 403 tons of maasbanker in July 1957.

The Union's total pilchard-maasbanker landings to the end of July was 286,925 short tons, made up of 267,633 tons of pilchards and 19,292 tons of maasbanker. The mackerel landings of 35,574 tons brought the shoal fish total to 323,499 tons. The 1959 season continued for the first two weeks in August.

The July 1959 landings in the Union yielded 14,780 short tons of fish meal, 361,612 Imperial gallons of fish oil, 63,840 pounds of canned pilchards, 13,260 pounds of canned maasbanker, and 39,744 pounds of canned mackerel.

The August (1 through 14) catch for the Union of South Africa west coast was 19,163 tons of pilchards and 192 tons maasbanker or jack mackerel. This compares with 26,706 tons of pilchards, 800 tons of maasbanker, and 4 tons of mackerel caught in the entire month of August 1958 and 7,612 tons of pilchards and 749 tons of maasbanker in August 1957.

Products produced from the August 1959 Union of South Africa catch were 4,521 tons fish meal, 79,572 Imperial gallons fish oil, and 31,006 pounds canned pilchards.

The South-West African Walvis Bay landings in July 1959 were 54,838 tons of pilchards and 423 tons of maasbanker.

These landings yielded 10,598 short tons of fish meal, 3,596 long tons of fish oil, and 15,505,169 pounds of canned fish. Pilchard fishing from Walvis Bay, South-West Africa, was affected in August by very bad weather. Boats had to travel 4 to 6 hours north north-west to find fish. The South-West Africa catch in August 1959 was 33,931 tons which yielded 7,429 tons of fish meal, 1,943 tons of fish oil, and 7,980,708 pounds of canned fish.

When the South-West Africa Walvis Bay pilchard-maasbanker quota of 260,000 tons was increased for the season by 40,000 tons in July 1959, it was indicated that the season would end by October 10. Most of the factories found, however, that they could not make their individual quotas by that date and so the season was again extended to October 31. Reports from South-West Africa state that fish, though mixed in size and age, yielded an average of 10 Imperial gallons of oil per short ton of raw fish. Canning virtually stopped in August and landings after that month were utilized for meal and oil. (The South African Shipping News and Fishing Industry Review, September 1959 and October 1959.)

* * * * *

THREE NEW PILCHARD RESEARCH VESSELS:

Three new research vessels for work on the pilchard-maasbanker resources of the south-west coast of South Africa have been completed and handed over to the Union of South Africa Fisheries Division.

The three vessels cost about £200,000 (US\$560,000). To recover this cost (and the capital cost of new shore laboratories), the South African Fisheries Development Corporation levies fishermen and processors 2d. and 4d. (about 2.3 and 4.7 U. S. cents) a ton, respectively, on pilchard-maasbanker and mackerel landings.

The research vessels will work in Benguela Current waters which extend for 1,000 miles from the Cape north to the mouth of the Kunene River on the South-West Africa-Angola border.

The Union and South-West Africa fish resources have given rise to an industry

Union of South Africa and
South-West Africa (Contd.):

operated by 300 large boats and 19 processing factories, with a capital investment of £12,000,000 (about US\$33.6 million). From a catch of up to 500,000 metric tons each a year, there is produced canned fish, fish meal, and fish oil valued at about £8,000,000 (\$22.4 million).

The largest of the three new research vessels, the 120-foot, 360-ton (displacement) Sardinops, is reportedly the largest ever built in South Africa. It was designed by the Food and Agriculture Organization Fishing Boat Section Chief and the managing director of a South African firm.

In a description of the Sardinops, the editor of South African Shipping News and Fishing Industry Review says:

"For a ship of her size, the Sardinops is remarkably spacious and well equipped. She has a crew of 14 and can carry up to three scientists. Six of the crew are accommodated forward in the fore-castle below the level of the main deck. Immediately aft of this crew space are three double cabins and a single berth cabin for 2 deck and 2 engineer officers, and 3 scientists.

"These cabins open out to a corridor which leads farther aft to the chemical laboratory which is situated below the larger biological laboratory built into welded steel deckhouse. This deckhouse has been placed about 2 feet inboard on each side of the bulwarks to provide adequate working space around the hydrographical booms and winches. It is topped forward by a spacious wheelhouse which projects on three sides over the main deckhouse structure. Aft of the wheelhouse is the captain's cabin and the wireless room.

"Officers' mess, petty officers' mess, toilets, washrooms, a galley equipped with refrigerator and electric range, and the engineroom casing are all built into the aft section of the deckhouse.

"The Sardinops is completely equipped to collect water samples, to make

plankton and blanket net hauls, to trawl, and to test different types of fishing gear. To carry out this work, she is fitted throughout with hydraulic trawl winches, long-line hauler, and hydrographic deep-water and shallow-water winches. . . . The winches are worked through hydraulic pipelines connected to a 60 hp. pump directly connected to the main engine. A second pump is driven from an auxiliary engine."

The ship is powered by a Danish five-cylinder two-stroke loop-scavenging oil engine developing 600/660 b.hp. at 310 r.p.m. This engine is connected through a nonreversible friction clutch to a controllable-pitch propeller. The control of the propeller pitch, clutch, and engine speed is effected directly from the bridge.

Auxiliary plant comprises two Diesel generating sets, each developing 86 hp. at 1,150 r.p.m. and driving 55 kw. generators.

On her trials and in subsequent initial survey cruises, the Sardinops easily maintained her designed service speed of 10 knots. The ship has proved remarkably simple to maneuver, and the combination of slow-running engine and controllable-pitch propeller gives her a range comparable to that of the much larger Africana II and also makes her an extremely economic vessel to operate.

Another interesting feature of the Sardinops is the wide range of wireless, fish-finding, and navigational equipment carried. Her wireless is a 120-watt radiotelephone set, and she has a Type 14 radar, log, gyro compass with bearing repeater, and vertical and horizontal echo recorders.

The two other new South African research vessels, Trachurus and Kunene, were designed by the chief of the FAO Fishing Boat Section. They will work nearer the coast than Sardinops. Each of the two is just under 70 feet long with moulded breadth of 22 feet and draught of 8½ feet. Each has a raking stem; raised enclosed fore-castle, a high aluminium deckhouse placed slightly aft; a transom stern; and a crew of 9 and 2 scientists in a comfortable cabin situated just below the foredeck. As in the

Union of South Africa and
South-West Africa (Contd.):

Sardinops, six seamen are accommodated in combined sleeping quarters and mess room in the forecabin.

The accent in these boats is again on concentrating as much equipment as possible in the restricted space available. Scientists have ample working space on the foredeck and aft.

The hydraulic trawl winch is fitted forward on the port side and alongside it, as aboard the Sardinops, is a long-line hauler. In the working section aft of the deckhouse is one of the two hydraulic winches for working plankton tow nets and the blanket net, and a second hydraulic winch with hydrographic boom is placed on the port side between deckhouse and bulwark.

Each boat has a single large laboratory situated immediately below the bridge. Galley and officers' messroom are below the main deck forward.

Vertical and horizontal echo-recorders are fitted in each boat, which also carries a radiotelephone.

The main engine of the Trachurus and the Kunene is a Danish 3-cylinder unit developing 180 b.hp. at 375 r.p.m. Again, the engine is connected through nonreversible friction clutch to a controllable-pitch propeller and all control is from the bridge.

On trials, the Trachurus and Kunene maintained average speeds of 9.6 and 9.7 knots, and should therefore comfortably maintain their designed cruising speed of 9 knots. The boats also have been tried on preliminary research cruises and are considered ideal for their exacting work. (The Australian Fisheries Newsletter, September 1959.)



U. S. S. R.

FISHERY RESEARCH SUBMARINE
USED TO OBSERVE UNDERWATER
BEHAVIOR OF TRAWL:

The third trip of the Russian fishery research submarine Severyanka was de-

voted principally to observing the behavior of the otter trawl underwater. The Severyanka, a Russian submarine converted for fishery and oceanographic research under water, sailed on its third trip in April 1959. The operation required close and delicate maneuvering near the moving trawl.

The submarine remained directly below the trawl for several hours while engineers observed and made motion pictures of its behavior. In all, the studies extended over several days. It is expected that the results of the observations will aid in the design of new types of trawls.

At times, the Severyanka settled to the bottom of the sea for observations of marine life.

Work with hydroacoustical instruments made it possible to measure the zones of action of the echo sounders, that is, to explore the space around the submarine which is penetrated by ultrasonic energy and within the limits of which it is possible to detect schools of fish and other objects.

The third trip of the submarine was one of many trips scheduled for several years. Preparations for a fourth trip were made in mid-1959.

The Severyanka made its first trip in December 1958 in the region of Murmansk and its second trip in the herring fishing regions of the North Atlantic. Both of these trips resulted in much new and interesting scientific material. For example, the 24-hour behavior of Atlantic herring was studied. A number of oceanographic investigations were conducted. It was impossible, however, to observe the operation of the variable-depth or midwater trawl used because of the poor visibility under water during the polar night. Scientists aboard also found out how bottom fish react to danger and tested the effectiveness of finding fish with hydroacoustical instruments.

Increasing the catch of fish has been established as an objective of the Seven-Year Plan by the 21st Party Congress.

(This account (titled "Trawl above the SEVERYANKA") of the third trip of the

U. S. S. R. (Contd.):

Severyanka, research submarine of the All-Union Scientific Research Institute of the Fish Economy and Oceanography, by V. Azhazha, Chief of the Laboratory of Technical Instruments for Underwater Research, appeared in the May 24, 1959, issue of Sovetskiy Flot, Moscow.)

Note: Also see Commercial Fisheries Review, July 1959, p. 91; February 1959, p. 68.

SALMON CATCHES AND HATCHERIES:

Russian salmon catches have steadily declined from 1955 through 1958, according to a statement made by Michail N. Mironov, a Soviet fisheries official, at the International North Pacific Fisheries Commission annual meeting in Seattle early in November 1959. Catches dropped from 172,400 metric tons in 1955, to 160,000 tons in 1956, 150,000 tons in 1957, and 73,000 tons in 1958. Although 1959 catches are not yet available, Mironov said that they will be below those for 1958.

The Russian official, an observer at the meeting since Russia is not a member of the Commission, states that his country is trying to build the runs of salmon by strict regulation of fishing off its shores, closing spawning areas and stream mouths to fishing, opening new fisheries research institutes, and expanding its hatchery program.

Russia will more than double its number of salmon hatcheries in the next seven years. A total of 38 new hatcheries is planned in order to bring the annual production of salmon to 1.4 billion fish. Russia now has 32 hatcheries, producing 600 million salmon.

United KingdomBRITISH QUEEN PROMISES CONTINUATION OF AID TO FISHING INDUSTRY:

A continuation of subsidies and grants to the fishing industry was promised by the British Queen in a speech, delivered at the opening of the new Parliament on

October 27, 1959. She stated: "Proposals will be put before you also to continue the subsidies and grants given to the fishing industry and to make further provision for cooperation in international measures of conservation.

"At the Second World Conference on the Law of the Sea, to be held next spring, my Ministers will work for a just and reasonable settlement of the unresolved problems of the breadth of the territorial sea and of fishery limits." (The Fishing News, October 30, 1959.)

IMPORT CONTROLS ON FRESH AND FROZEN SALMON REMOVED:

A joint statement was made by the Departments of State, Treasury, and Commerce regarding an announcement by the United Kingdom that many of the remaining controls on imports would be removed, effective November 9, 1959.

This liberalization improves the opportunities of United States firms to compete in British markets. The list of products which United States exporters will now be able to market in the United Kingdom without quantitative restrictions includes fresh and frozen salmon. With the exception of tobacco manufactures and pharmaceuticals, all products previously imported from North America under the British Token Import Plan will also be free from restrictions.

The United Kingdom will still apply discriminatory restrictions on a number of dollar commodities including important fishery products like frozen halibut. The United States Government hopes that the United Kingdom will continue making rapid progress in removing restrictions until complete liberalization is achieved.

USE OF ANTIBIOTICS AS A FISH PRESERVATIVE UNDER STUDY BY SCIENTISTS:

"Ice incorporating antibiotics" was the theme of a discussion radio broadcast by a scientist from the British Torry Research Station. He revealed that scientists are now collecting data for an expert panel which is finding out if the introduction of antibiotics as a preservative will involve any health hazard.

The scientist explained that by adding antibiotics they would hope to extend the usefulness of ice. By using chemi-

United Kingdom (Contd.):

cal compounds the aim would be to kill or keep in check the bacteria causing spoilage and so assist in preserving in better condition the first catches of long-distance trawlers.

Researchers have found that by adding only a few parts per million in the ice, they can extend the edibility by about 7 and sometimes even 10 days with fish like cod, haddock, and plaice. The use of the treated ice would enable the vessels to bring in fresher fish.

The antibiotics, said the scientist, could be added in small quantities as the ice is being made. This, he said, might add 15s. (US\$2.10) per ton to the price of the ice.

It is now known what sort of preservation the antibiotics can give. Data are being prepared for an expert panel set up under the Ministry of Health and the Ministry of Agriculture, Fisheries, and Food.

It is necessary to know what quantities of the antibiotics in the ice are absorbed by the fish during storage and what is the fate of these quantities after cooking. With this information the panel will be in a better position to decide whether or not there is any health hazard involved. (*The Fishing News*, October 30, 1959.)



Yugoslavia

CONTRACTS WITH JAPAN FOR
YEAR'S SUPPLY OF FROZEN TUNA:

Yugoslavia in October 1959 was reported to have contracted with three big fish suppliers of Japan to buy its entire annual requirements of frozen tuna

which is estimated to amount to about 7,000 metric tons. Delivery is scheduled October 1959-May 1960. Yugoslavia has imported tuna usually from Turkey which conducts a small fishery in the Black Sea. But currently the trade agreement between Yugoslavia and Turkey is suspended. Sales to Yugoslavia of Japanese frozen tuna caught in the Atlantic began early in 1959.

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TUNA FISHING METHODS
TAUGHT BY JAPANESE:

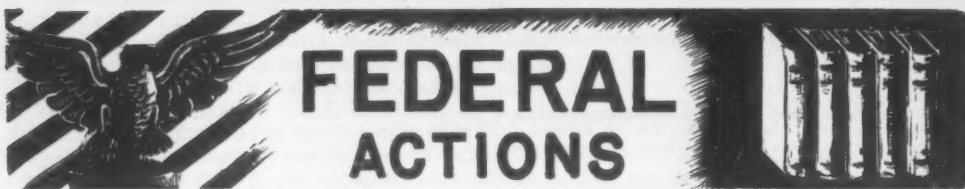
As part of a plan to increase tuna catches by Yugoslavian fishermen in the Adriatic, Japanese technical fishermen are teaching tuna long-lining methods to fishermen aboard Yugoslav vessels.

It has also been reported that a Yugoslavian businessman is visiting Japan in order to buy new tuna vessels from the country. Negotiations are under way for the building of 6 to 10 tuna vessels of the 1,000-ton class. There is also under discussion a plan that half the crew of the tuna vessels would be made up of Japanese fishermen.

ANTARTIC FISH HAVE WHITE BLOOD

Russian scientists have discovered unique "white blooded" fish in the Antarctic. According to preliminary reports published by the Oceanographic Institute in Moscow, the research ship Ob, during the second expedition in the Antarctic, has made a discovery of extraordinary interest for zoologists: the scientists on board the Ob caught 18 fish whose blood contained no haemoglobin.

The 18 fish belonged to 8 different species and in four of these species this colorlessness or "whiteness" of the blood was encountered for the first time. Four of these species were entirely new to science. It is pointed out that this condition among vertebrae is unique since the presence of haemoglobin in the blood as carrier of oxygen is commonly accepted to be absolutely necessary for the sustaining of life. The Russian scientists have taken samples of this "white" blood of the fish to Russia in order to carry out further biochemical analyses and histological investigations. No explanation of this phenomenon has yet been given. (*The South African Shipping News and Fishing Industry Review*, June 1959.)



FEDERAL ACTIONS

Department of the Interior

U. S. FISH AND WILDLIFE SERVICE

BUREAU OF COMMERCIAL FISHERIES

FROZEN COD FILLETS VOLUNTARY STANDARDS PROPOSED:

Frozen cod fillet voluntary grade standards are proposed by the U. S. Bureau of Commercial Fisheries. The regulations are proposed for adoption in accordance with the authority contained in Title II of the Agricultural Marketing Act of August 14, 1956, as amended. Functions under that Act pertaining to fish, shellfish, and any products thereof were transferred to the Department of the Interior by section 6(a) of the Fish and Wildlife Act of August 8, 1956. These regulations, if recommended to the Secretary of the Interior for adoption and made effective, will be the first issued by the Department prescribing voluntary grade standards for frozen cod fillets.

Prior to the final adoption of the proposed regulations as published in the November 21, 1959, issue of the Federal Register, consideration will be given to any written data, views, or arguments relating thereto which were received by the Director, Bureau of Commercial Fisheries, U. S. Department of the Interior, Washington 25, D. C., before December 18, 1959.

The proposed regulations include product and grade description; factors of quality, including evaluation of flavor, odor, appearance, size, absence of defects, and character; definitions and methods

of analysis; lot certification tolerances; and score sheet.



Treasury Department

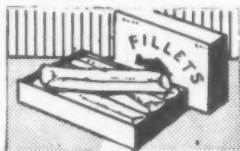
BUREAU OF CUSTOMS

PROPOSED ANTIDUMPING REGULATIONS:

Proposed regulations under the Antidumping Act of 1921, as amended, were published in the October 10, 1959, Federal Register by the U. S. Bureau of Customs. The new regulations are intended to implement the 1958 amendment to the Antidumping Act in which Congress sought to provide for greater certainty, speed, and efficiency in the enforcement of the Act. The 1958 amendment also contained new definitions for determining fair market value of imported merchandise and eased the burden on domestic industry in proving injury.

The initial proposal on implementing the 1958 amendment was published by the Bureau of Customs in October 1958 and comments were invited. The Bureau incorporated a number of changes in the proposed regulations and again invited comments which were to be submitted not later than November 10, 1959. However, the Bureau of Customs announced in the November 21, 1959, Federal Register that comments would be received until December 31, 1959.

The proposed regulations cover suspected dumping; fair value of imported merchandise; determination of act or likelihood of sales at less than fair value; determination of injury; finding of dumping; action by the appraiser; release of merchandise; requirement of bond;



conversion of currencies; modification or revocation of finding; publication of findings; dumping duty; notice to importer; and method of computing dumping duty.

* * * * *

FURTHER RULING ON "IN BULK" AND "IMMEDIATE CONTAINER" FOR FISH BLOCKS:

Frozen fish fillet blocks packed with a wrapping that completely covers the fish and weighing less than 15 pounds are dutiable at the rate of $12\frac{1}{2}$ percent ad valorem, according to a December 1, 1959, ruling of the U. S. Bureau of Customs. This supplements but does not supersede previous rulings.

In November 1959 the Bureau of Customs at Washington, D. C., was asked to rule as to the duty status of fish blocks packed in their respective wrappings and tied together with rope, twine, or a strap in bundles of 4 or 5 blocks to a bundle. In the case for which a ruling was asked, reports from the field showed that the individual blocks are generally stamped with the word "cod," "hake," "haddock," or "pollock," so as to distinguish the kind of fish, as the price varies according to the kind of fish.

The fish blocks in question are classifiable under paragraph 720(b), Tariff Act of 1930, as fish, prepared, not specially provided for, following the deci-

sion in recent Customs Court decision (C. D. 2101). The question, then, was whether the fish blocks were "in bulk" or "in immediate containers weighing with their contents over 15 pounds each."

The Bureau of Customs pointed out that: "Lexicographers define the term 'in bulk' as meaning in a mass; not enclosed in separate packages or divided into parts; in such a state that any desired quantities may be removed. The Bureau believes that the fish blocks in bundles described. . . are not merchandise in bulk.

"Each individual frozen fish block is contained in a lightweight tray or carton (with top) which completely covers the frozen fish block, the weight of the contents and the cardboard tray is less than 15 pounds (usually $13\frac{1}{2}$ or $13\frac{3}{4}$ pounds), and is individually marked to describe its composition. When such blocks are tied together in a bundle the Bureau considers the tray or carton around each individual frozen fish block to be the immediate container. The fish blocks are classifiable under paragraph 720(b) as fish, prepared, not specially provided for, and, because their weight together with their immediate containers is not more than 15 pounds they are dutiable at the rate of $12\frac{1}{2}$ percent ad valorem under that paragraph, as modified."

Note: Also see Commercial Fisheries Review, December 1959, p. 102.



HIGH PERCENTAGE OF 1958 FISH AND SHELLFISH CATCH GOES TO MEAL AND OIL USE

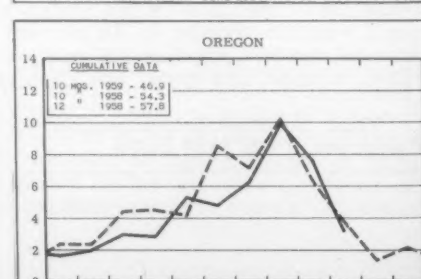
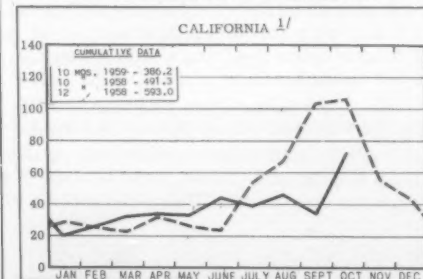
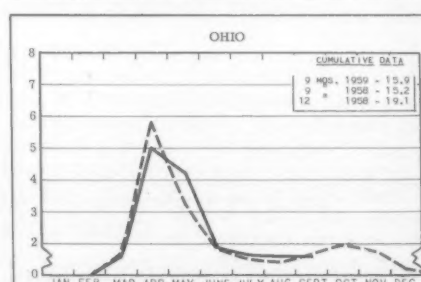
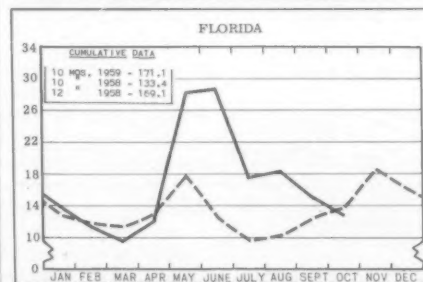
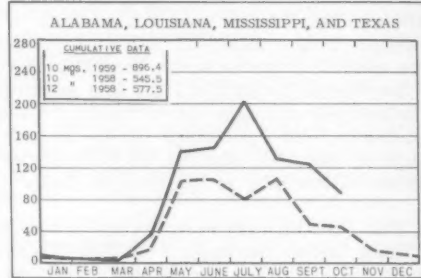
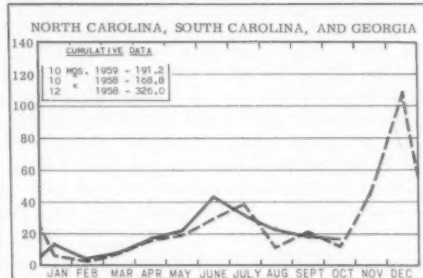
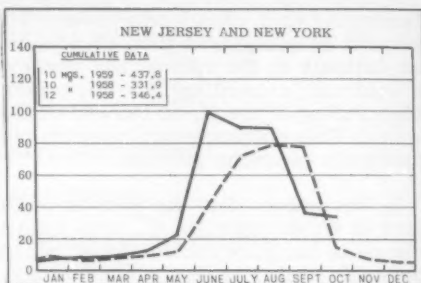
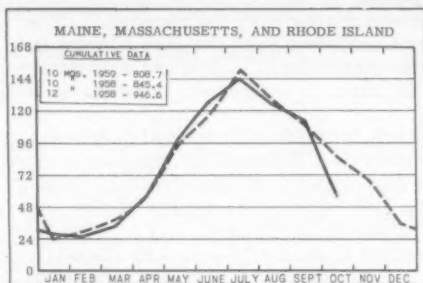
Information assembled by the U. S. Bureau of Commercial Fisheries on the utilization of the 1958 United States catch of fish and shellfish indicates that about 1.9 billion pounds, or 40 percent, was used directly for the manufacture of fish meal and oil. Another 700 million pounds of waste from fish marketed fresh, frozen, canned, and cured was likewise used in the manufacture of meal and oil.

Thus, the total poundage used for that purpose actually accounted for about 55 percent of the 1958 catch.

FISHERY INDICATORS

CHART 1 - FISHERY LANDINGS for SELECTED STATES

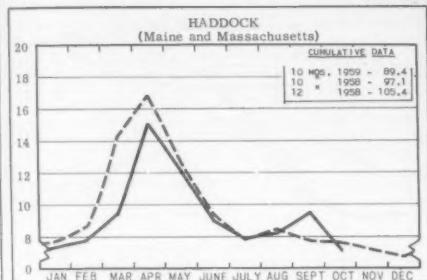
In Millions of Pounds



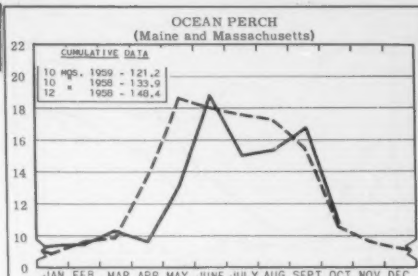
1/ONLY PARTIAL--INCLUDING PRODUCTION OF MAJOR FISHERIES AND MARKET FISH LANDINGS AT PRINCIPAL PORTS.

CHART 2 - LANDINGS for SELECTED FISHERIES

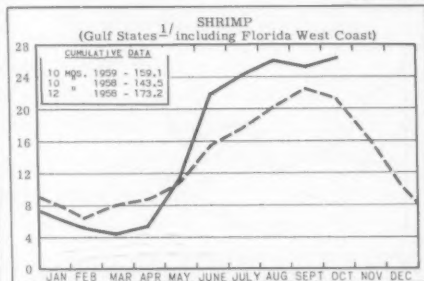
In Millions of Pounds



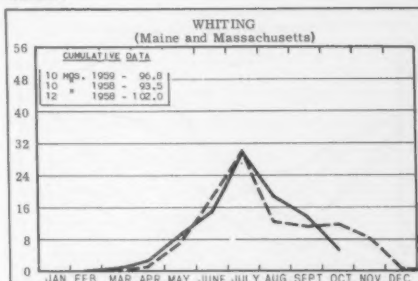
LEGEND:
— 1959
- - - 1958



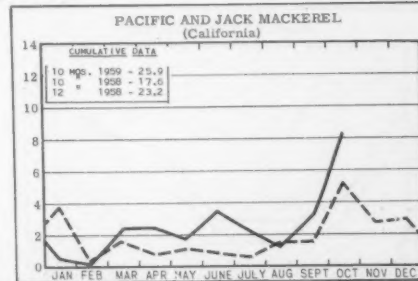
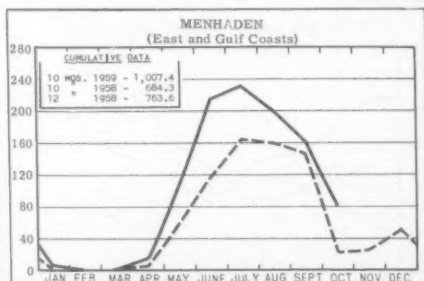
In Millions of Pounds



^{1/2} LA. & ALA. DATA BASED ON LANDINGS AT PRINCIPAL PORTS AND ARE NOT COMPLETE.



In Thousands of Tons



In Thousands of Tons

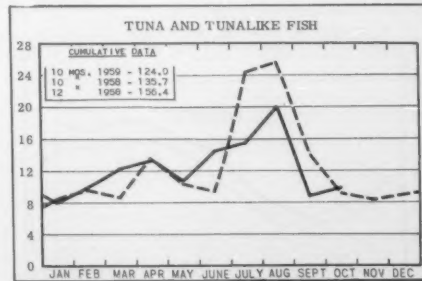
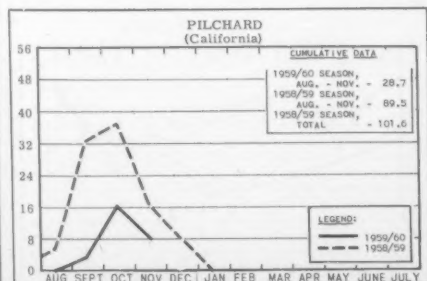
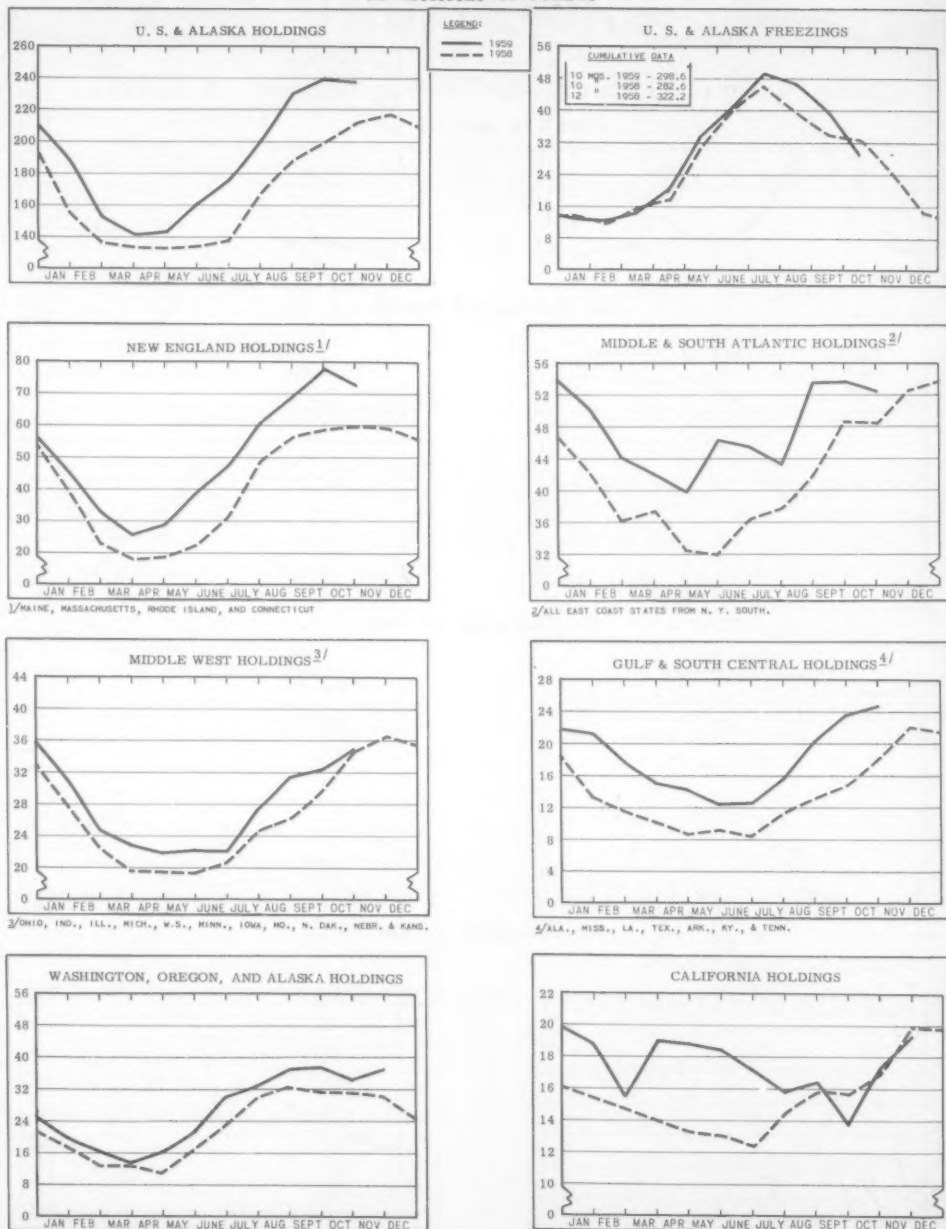


CHART 3 - COLD-STORAGE HOLDINGS and FREEZINGS of FISHERY PRODUCTS *

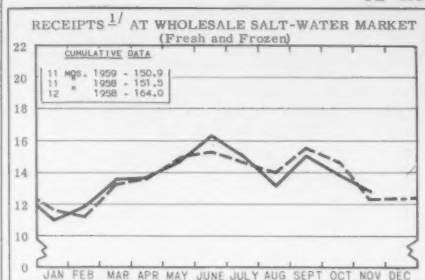
In Millions of Pounds



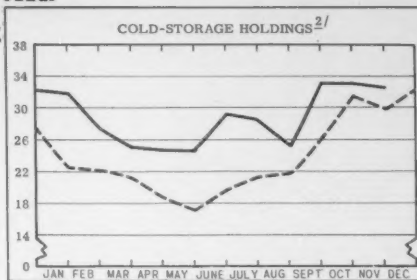
* Excludes salted, cured, and smoked products.

CHART 4 - RECEIPTS and COLD-STORAGE HOLDINGS of FISHERY PRODUCTS at PRINCIPAL DISTRIBUTION CENTERS

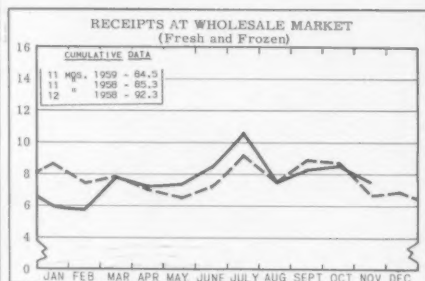
In Millions of Pounds



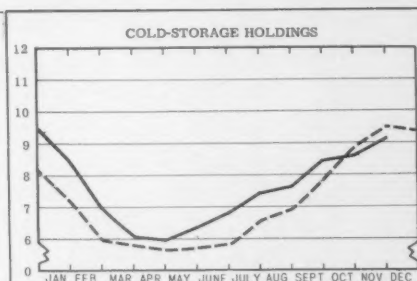
NEW YORK CITY



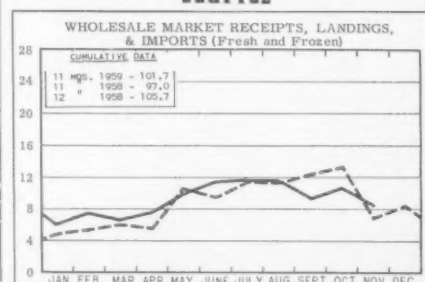
^{2/}AS REPORTED BY PLANTS IN METROPOLITAN AREA.



CHICAGO



SEATTLE



LEGEND:
— 1959
--- 1958

BOSTON

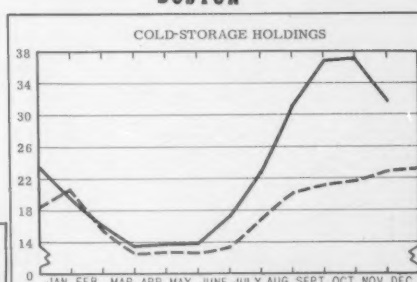


CHART 5 - FISH MEAL and OIL PRODUCTION - U.S. and ALASKA

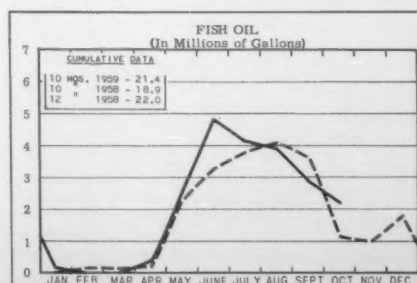
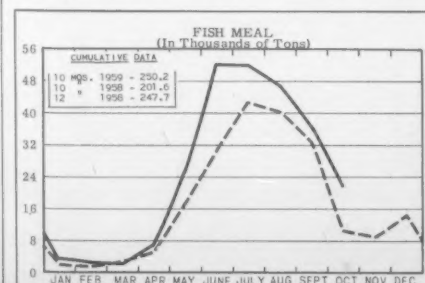
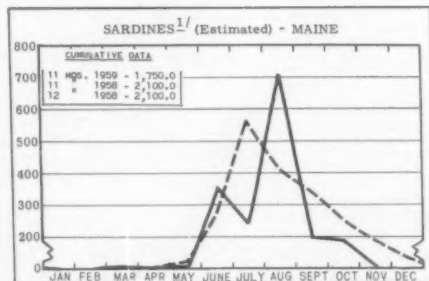
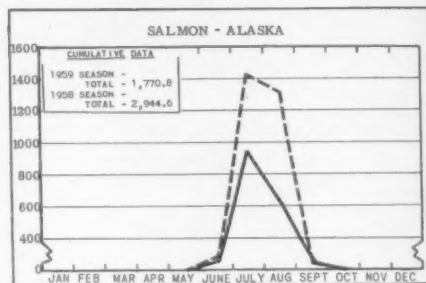
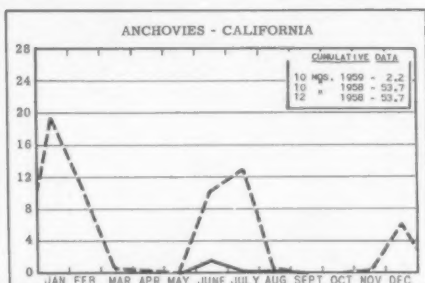
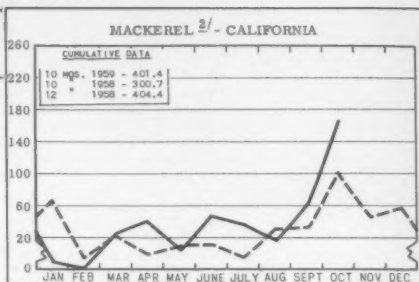
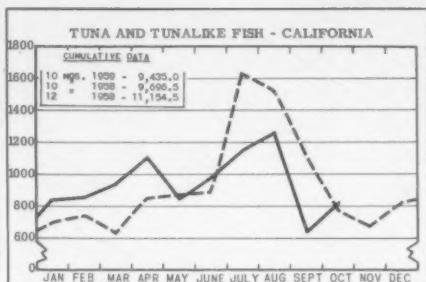


CHART 6 - CANNED PACKS of SELECTED FISHERY PRODUCTS

In Thousands of Standard Cases



STANDARD CASES

Variety	No. Cans	Designation	Net Wgt.
SARDINES.....	100	$\frac{1}{2}$ drawn	$3\frac{1}{2}$ oz.
SHRIMP.....	48	--	8 oz.
TUNA.....	48	# $\frac{1}{2}$ tuna	6 & 7 oz.
PILCHARDS..	48	# 1 oval	15 oz.
SALMON.....	48	1-lb. tall	16 oz.
ANCHOVIES...	48	$\frac{1}{2}$ -lb.	8 oz.

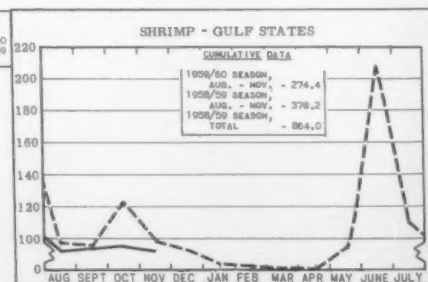
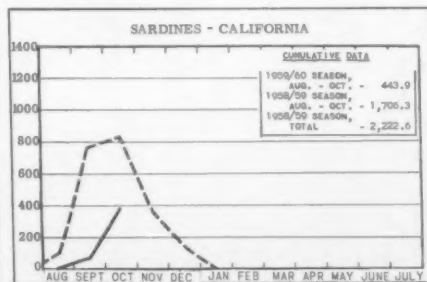
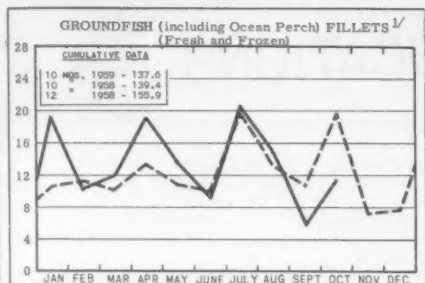
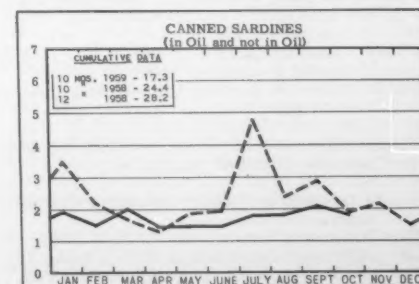
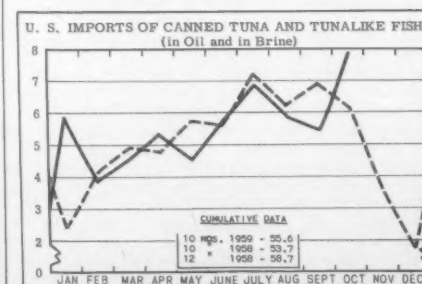
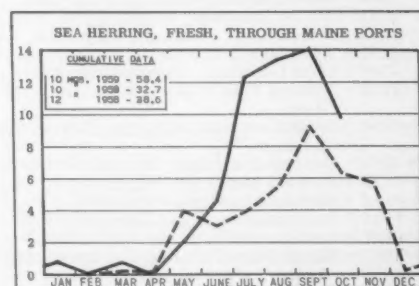
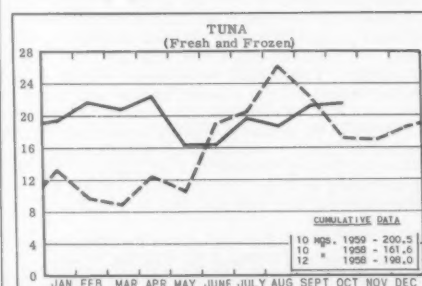
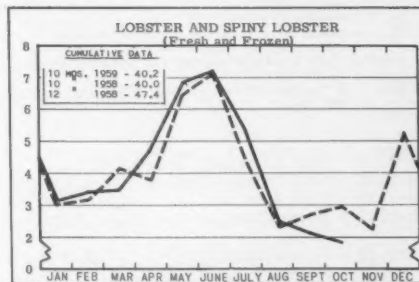
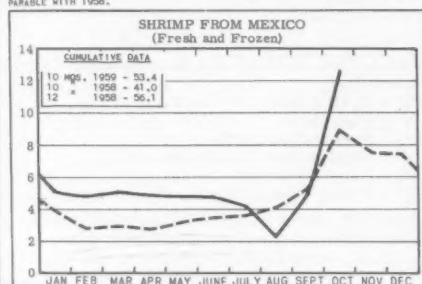
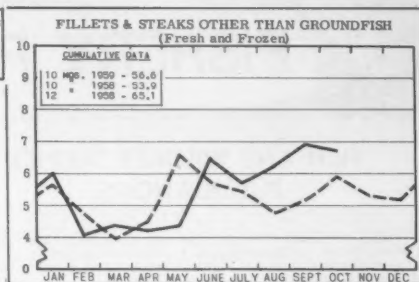


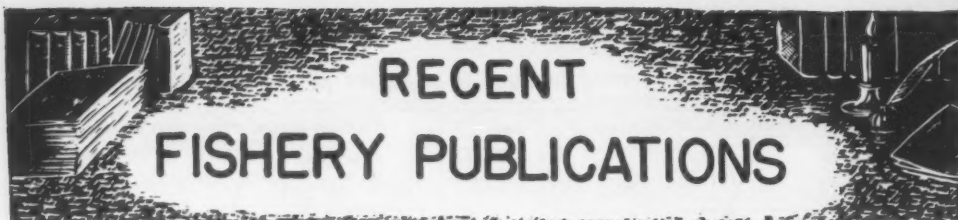
CHART 7 - U.S. FISHERY PRODUCTS IMPORTS

In Millions of Pounds



^{1/}SINCE SEPTEMBER 15, 1959, FISH FILLET BLOCKS ARE CLASSIFIED UNDER A DIFFERENT CATEGORY THAN FILLETS; THEREFORE, 1959 DATA ARE NO LONGER COMPARABLE WITH 1958.





FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE DIVISION OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

- CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES AND ALASKA.
FL - FISHERY LEAFLET.
SL - BRANCH OF STATISTICS LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
SSR, - FISH, - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

- | Number | Title |
|----------|---|
| CFS-2119 | - Ohio Landings, July 1959, 2 pp. |
| CFS-2120 | - New Jersey Landings, July 1959, 3 pp. |
| CFS-2129 | - Fish Meal and Oil, August 1959, 2 pp. |
| CFS-2130 | - North Carolina Landings, August 1959, 3 pp. |
| CFS-2132 | - Texas Landings, July 1959, 3 pp. |
| CFS-2137 | - Massachusetts Landings, July 1959, 5 pp. |
| CFS-2139 | - Rhode Island Landings, July 1959, 3 pp. |
| CFS-2141 | - Maine Landings, August 1959, 3 pp. |
| CFS-2142 | - Mississippi Landings, July 1959, 2 pp. |
| CFS-2145 | - New Jersey Landings, August 1959, 3 pp. |
| CFS-2146 | - Ohio Landings, August 1959, 2 pp. |
| CFS-2148 | - Frozen Fish Report, September 1959, 8 pp. |
| CFS-2150 | - South Carolina Landings, August 1959, 2 pp. |
| CFS-2151 | - Georgia Landings, August 1959, 2 pp. |
| CFS-2152 | - Florida Landings, August 1959, 7 pp. |
| CFS-2154 | - Shrimp Landings, June 1959, 6 pp. |
| CFS-2156 | - Alabama Landings, July 1959, 2 pp. |
| CFS-2157 | - Louisiana Landings, April 1959, 2 pp. |
| CFS-2160 | - Rhode Island Landings, August 1959, 3 pp. |
| CFS-2164 | - California Landings, May 1959, 4 pp. |
| CFS-2168 | - Louisiana Landings, May 1959, 2 pp. |
| CFS-2178 | - Fish Sticks and Portions, July-September 1959, 3 pp. |
| CFS-2196 | - Mississippi River Fisheries, 1958 Annual Summary, 7 pp. |
| CFS-2199 | - Lake Fisheries, 1958 Annual Summary, 11 pp. |
| FL-336pp | - Commercial Fisheries Outlook, October-December 1959, 46 pp., illus. |

Wholesale Dealers in Fishery Products (Revised):

- SL-3 - Massachusetts, 1959.
SL-25 - Wisconsin (Great Lakes Area), 1959.
SL-28 - Michigan (Great Lakes Area), 1959.
SL-30 - Pennsylvania (Great Lakes Area), 1959.
SL-42 - Kentucky (Mississippi River and Tributaries), 1959.

Firms Canning, 1958 (Revised):

- SL-108 - Salmon Eggs for Bait.
SL-109 - Caviar and Fish Roe.
SL-110 - Oysters.
SL-116 - Food for Animals, From Marine Animal Products.
SL-117 - Pacific Sea Herring.
SL-118 - Groundfish Flakes.
SL-119 - Squid.
SL-120 - Anchovies.

Firms Manufacturing, 1958 (Revised):

- SL-151A - Fish Solubles and Homogenized Condensed Fish.
SL-152 - Oyster Shell Products.
SL-153 - Fish Glue.
SL-154 - Seaweed Products.
SL-155 - Marine Pearl Shell Buttons.
SL-156 - Pearl Essence.
SL-159 - Fresh-Water Mussel-Shell Products.

SSR-Fish, No. 294 - Progress Report on Alaska Fishery Management and Research, 1958, 32 pp., illus., June 1959. A review of the work of the U. S. Bureau of Commercial Fisheries in assisting the Alaska fisheries during 1958. One section describes activities in the Alaska salmon fishery by regions. Another section summarizes progress in the marine fisheries, with details on the herring, crab, shrimp, and clam industries. The inside back cover shows statistical tables on the Alaska canned salmon pack for 1958. Principal mission of the Bureau in Alaska is to achieve maximum sustained production of fishery products by maintaining the presently-fished populations at highest levels and bringing into production species not now being utilized, say the authors in summary.

SSR-Fish, No. 308 - Survey of the United States Shrimp Industry, Volume II, 176 pp., illus., June 1959. Shrimp supplies for the anticipated increase in future consumption will depend on their continued abundance in waters presently fished, on the discovery of new fishing grounds, and on expanded imports, according to this report. Among the topics covered by volume II are trends in distribution of shrimp; market channels; market agents; a survey of wholesale and retail distribution; packaging, storage, transportation, and quality preservation and control of shrimp; market communications; consumption patterns; nutritive value; statistics on apparent consumption; and ex-vessel, wholesale, and retail prices. The final chapter presents conclusions and recommendations aimed at the future well-being of the industry. The first volume provides a comprehensive examination of shrimp grounds, vessel construction, fishing operations, processing plant efficiency, and processing costs (SSR-Fish, No. 277).

SSR-Fish. No. 310 - Northeastern Pacific Albacore Survey, Part I--Biological Observations, by Joseph J. Graham, 36 pp., illus., July 1959.

Sep. No. 570 - Second World Fishing Boat Congress: Part I - Observations of a United States Government Fishery Methods and Equipment Specialist; Part II - Observation of a United States Government Fishery Technologist; and Part III - Fish Quality Stressed.

Sep. No. 571 - An Economic and Financial Study of the Fluke Otter-Trawl Fishery of New Jersey.

Sep. No. 572 - A Report to the Shellfish Industry.

Sep. No. 573 - Equipment Note No. 2--Pacific Coast Drum Trawling.

Alaska Fisheries Briefs, Fish and Wildlife Circular 59, 21 pp., illus., processed, September 1959. A collection of articles intended to acquaint the fishing industry of Alaska and neighboring regions with some of the aspects and preliminary results of investigations which are being undertaken by the Bureau of Commercial Fisheries and its contractors in Alaska. Includes the following: "Pink Salmon Migrations Along the Alaska Peninsula," by Fredrik V. Thorsteinson; "Salmon Migrations in Southeastern Alaska," by Wallace H. Noerenberg; "The Unexpected Appearance of Pink Salmon in the Kvichak River," by Clarence D. Becker; "Gravel Removal and the Fisheries," by Robert McVey; and "Estimating Abundance of Salmon Fingerling," by Howard S. Sears.

Galveston Biological Laboratory Fishery Research (for the year ending June 30, 1959), Circular 62, 130 pp., illus., processed, September 1959. Summarizes the research work accomplished at the Galveston Biological Laboratory during the last fiscal year. Describes in detail investigations on the shrimp fishery, estuarine ecology, industrial fishery, and red tide; effects of engineering projects; and special projects such as the bait shrimp fishery of Galveston Bay, seasonal barnacle attachment in East Lagoon, and the Gulf V plankton sampler. Of particular interest is the assessment of the value and extent of the industrial fishery. The rapid expansion of this fishery will aid the industry by providing off-season raw material and employment to the menhaden fishery and by utilizing the fishing capacity of shrimp trawlers during periods of shrimp scarcity.

Progress in Sport Fishery Research, 1957-58, Circular 57, 92 pp., illus., processed. Sport fishery research is concerned with fish propagation research such as trout and salmon culture, and warm-water fish propagation; fishery management research on public waters, like those of the National Park Service which have been used as outdoor laboratories for studies of lake and stream productivity and experimental management techniques; and research on environmental influences which affect the welfare of the fish. This report discusses progress during 1957-58 on fish management research, fish disease research, fish nutrition research, and research on fish cultural methods.

THE FOLLOWING MARKET NEWS LEAFLETS ARE AVAILABLE FROM THE BRANCH OF MARKET NEWS, BUREAU OF COMMERCIAL FISHERIES, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON 25, D. C.

Number	Title
MNL-1	Cuba's Fishing Industry, 1958, 10 pp.
MNL-2	List of Ship Owners and Operators in Peru's Fishing Industry, 5 pp.
MNL-3	Legislative Actions Affecting Commercial Fisheries, 86th Congress, 1st Session, 7 pp.

THE FOLLOWING ENGLISH TRANSLATIONS OF FOREIGN LANGUAGE ARTICLES ARE NOT FOR GENERAL DISTRIBUTION BUT ARE AVAILABLE FOR REFERENCE ONLY FROM THE U. S. FISH AND WILDLIFE SERVICE, BUREAU OF COMMERCIAL FISHERIES, P. O. BOX 3830, HONOLULU, HAWAII.

A Population Study on the So-Called Makajiki (Striped Marlin) of Both Northern and Southern Hemispheres of the Pacific. I--Comparison of External Characters, by Tadao Kamimura and Misao Honma, English translation, 6 pp., processed. (Translated from Report of the Nankai Regional Fisheries Research Laboratory, no. 8, March 1958, pp. 1-11.)

A Population Study on the So-Called Makajiki (Striped Marlin) of Both Northern and Southern Hemispheres of the Pacific. II--Fishing Conditions in the Southern Hemisphere, by Misao Honma and Tadao Kamimura, English translation, 12 pp., processed. (Translated from Report of the Nankai Regional Fisheries Research Laboratory, no. 8, March 1958, pp. 12-21.)

Studies on the Albacore. V--The Fishing Condition and Size of Albacore Taken in the South Pacific Ocean, by Misao Honma and Tadao Kamimura, English translation, 8 pp., processed. (Translated from Report of Nankai Regional Fisheries Research Laboratory, no. 6, March 1957, pp. 84-90.)

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED:

(Baltimore) Monthly Summary - Fishery Products, June, July, and August, 1959; 6, 6, and 7 pp., respectively. (Market News Service, U. S. Fish and Wildlife Service, 400 E. Lombard St., Baltimore 2, Md.) Receipts at Baltimore by species and by states and provinces for fresh- and salt-water fish and shellfish; and total receipts by species and comparisons with previous years; for the months indicated.

California Fishery Products Monthly Summary, August 1959; September 1959; 13 pp. each. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif.) California cannery receipts of tuna and tunalike fish, mackerel, and anchovies; pack of canned tuna, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; American Tuna Boat Association auction sales; for the months indicated.

(Chicago) Monthly Summary of Chicago's Fresh and Frozen Fishery Products Receipts and Wholesale Market Prices, August 1959, 15 pp. (Market News Service, U. S. Fish and Wildlife

Service, 565 W. Washington St., Chicago 6, Ill.) Receipts at Chicago by species and by states and provinces for fresh- and salt-water fish and shellfish; wholesale prices for fresh and frozen fishery products; and United States Great Lakes production, 1958 for the month indicated.

Gulf Monthly Landings, Production, and Shipments of Fishery Products, September 1959, 6 pp. (Market News Service, U. S. Fish and Wildlife Service, 609-611 Federal Bldg., New Orleans 12, La.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market; sponge sales; and fishing imports at Port Isabel and Brownsville, Tex., for the month indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, September and October, 1959; 4 pp. each. (Market News Service, U. S. Fish and Wildlife Service, 18 So. King St., Hampton, Va.) Fishery landings and production for the Virginia areas of Hampton Roads, Lower Northern Neck, and Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data; for the months indicated.

New England Fisheries--Monthly Summary, September 1959, 22 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston 10, Mass.) Reviews the principal New England fishery ports, and presents food fish landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, Provincetown, and Woods Hole), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and landings and ex-vessel prices for fares landed at the Boston Fish Pier and sold through the New England Fish Exchange; for the month indicated.

New York City's Wholesale Fishery Trade--Monthly Summary for July and August 1959, 21 and 20 pp., respectively. (Market News Service, 155 John St., New York 38, N. Y.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, imports entered at New York City, primary wholesaler prices for frozen products, and marketing trends; for the months indicated.

(Seattle) Washington, Oregon, and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, September 1959, 9 pp. (Market News Service, U. S. Fish and Wildlife Service, Pier 42 South, Seattle 4, Wash.) Includes landings and local receipts, with ex-vessel and wholesale prices in some instances, as reported by Seattle and Astoria (Oreg.) wholesale dealers; also Northwest Pacific halibut landings; and Washington shrimp landings; for the month indicated.

Shrimp Marketing at Chicago--Receipts, Wholesale Prices, and Trends, 1940-58, by G. A. Albano, 37 pp., processed. (Market News Service, U. S. Fish and Wildlife Service, 565 W. Washington St., Chicago 6, Ill.) A review of shrimp marketing at Chicago including receipts for the years 1940-58 and wholesale prices since 1948. An analysis of trends and developments in shrimp marketing prefaces the statistical part of the report. Data covering a 10-year period on cold-storage holdings, United States shrimp landings by areas, imports, availability and disposition of shrimp supplies, and other information are shown. The report also includes a reprint of the United States standards for grades of frozen raw breaded shrimp.

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, WASHINGTON 25, D. C.

Age and Growth of the Redfish (SEBASTES MARINUS) in the Gulf of Maine, by George F. Kelly and Robert S. Wolf, Fishery Bulletin 156 (From Fishery Bulletin of the Fish and Wildlife Service, vol. 60), 35 pp., illus., printed, 30 cents, 1959. The primary objective of this paper is to present age-growth information on the redfish or ocean perch population of the Gulf of Maine. This information was needed for the intelligent planning of a research program concerned with determining how this valuable fishery should be managed. Validity of the use of the otolith in age-growth studies of the redfish is demonstrated. According to the report, otoliths accrue one opaque and one hyaline band a year. The opaque band begins to form in April, the hyaline band in September. Otoliths preserved in ethanol may be read whole, although those from larger fish are more easily read after they are sectioned. Otoliths stored dry must be sectioned for reading. Redfish larvae can be collected in surface waters throughout the period of spawning, April to September. The fry descend into mid-depths as they grow and first appear on the bottom in August. Redfish reach an average length of about 50 mm. in their first year of life. The sexes grow at virtually the same rate until the tenth year, after which the male grows more slowly than the female. Redfish of the Gulf of Maine grow more slowly than those of northern European waters. While dominant age classes appear in the collections of young fish, they are not obvious in samples of older, commercially available fish.

Effects of Fertilizing Bare Lake, Alaska, on Growth and Production of Red Salmon (O. NERKA), by Philip R. Nelson, Fishery Bulletin 159 (from Fishery Bulletin of the Fish and Wildlife Service, vol. 60), 31 pp., illus., printed, 25 cents, 1959.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

ALABAMA:

An Economic Evaluation of the Commercial Fishing Industry in the T. V. A. Lakes of Alabama

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

during 1956, by Paul Bryan and C. E. White, Jr., Contribution No. 116, 5 pp., printed. (Reprinted from Proceedings of the Twelfth Annual Conference, Southeastern Association of Game and Fish Commissioners, pp. 128-132.) Southeastern Association of Game and Fish Commissioners, Columbia, S. C., 1958.

ALGAE:

An Introductory Account of the Smaller Algae of British Coastal Waters: Part I--Introduction and Chlorophyceae, by R. W. Butcher, Fishery Investigations Series IV, 91 pp., illus., printed. £1 5s (about US\$3.51). Her Majesty's Stationery Office, York House, Kingsway, London W. C. 2, England, 1959. Covers methods of investigation, laboratory culture, taxonomic features, classification, ecology and distribution, and taxonomy of motile, unicellular algae found in in-shore waters of the British Isles. "Even a preliminary examination of the community of minute colored organisms has revealed new structures and new species of outstanding importance in the phylogeny of certain groups. Some have been shown to produce toxic compounds. . . others might be of value in the general nutrition of animals. . . ." states the author.

AMINO ACIDS:

"The Amino-Acid Composition of Some British Food Fishes," by J. J. Connell and P. F. Howgate, article, Journal of the Science of Food and Agriculture, vol. 10, April 1959, pp. 241-244, printed. The Society of Chemical Industry, 14 Belgrave Square, London S. W. 1, England.

ANGOLA:

Subsidio para um Catalogo dos Nomes Vernaculos dos Peixes Marinhos de Angola (Supplementary Catalogue of Common Names of Marine Fishes of Angola), by Pedro da Franca, Notas Mimeo-grafadas de Centro de Biologia Piscatoria (Mimeographed Notes from the Fishery Biology Center) no. 5, 1959, 38 pp., processed in Portuguese. Ministerio do Ultramar, Rua Dr. Antonio Candido, 9, Lisbon, Portugal.

ANTIBIOTICS:

Experiments in the Use of Antibiotics in Fish Preservation, by J. M. Shewan and J. Stewart, D. S. I. R. Food Investigation Memoir No. 1203, 15 pp., printed. Department of Scientific and Industrial Research, Charles House, 5-11 Regent St., London S. W. 1, England, 1958.

"Inhibition of Bacteria from Marine Sources by Aureomycin," by N. K. Velankar, article, Proceedings of the Indian Academy of Sciences, vol. 47B, 1958, pp. 87-96, printed. Indian Academy of Sciences, Bangalore, India.

BACTERIOLOGY:

"Bacteriology," article, Food Investigations 1957 (Report of the Food Investigation Board--Great Britain), pp. 21-23, printed. Department of Scientific and Industrial Research, Charles House, 5-11 Regent St., London S. W. 1, England, 1958. Reports the results of bacteriological examination of fresh and spoiling iced fish, ice used in chilling of fish, fish after han-

dling, and fish fillets. The study covers young cod caught in the waters of the Faroes and the North Cape and discusses types of organisms found and their frequencies.

Studies of FLAVOBACTERIUM PISCICIDA Bein I--Growth, Toxicity, and Ecological Considerations, by Samuel P. Meyers, Morris H. Baslow, Selwyn J. Bein, and C. Edith Marks, 6 pp., illus., printed. (Reprinted from Journal of Bacteriology, vol. 78, no. 2, August 1959, pp. 225-230.) Journal of Bacteriology, Williams and Wilkins Co., 428 E. Preston St., Baltimore 2, Md.

BIBLIOGRAPHIES:

Bibliography of Theses on Fishery Biology, by Robert M. Jenkins, 83 pp., processed, \$1. Sport Fishing Institute, Bond Bldg., Washington, D. C. A compilation of graduate theses on fishery biology and related subjects. Includes a short section on commercial fisheries.

BIOCHEMISTRY:

Studies on pH of Fish Muscle--Variation in pH of Fresh Albacore Muscle on the Locality Examined (Studies on the Tuna Meat--I), by Toshiharu Kawabata and others, 9 pp., illus., printed in Japanese with English abstract. (Reprinted from Bulletin of the Japanese Society of Scientific Fisheries, vol. 18, no. 3, August 1952, pp. 124-132.) Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

BRAZIL:

Notas Sobre o Crescimento, o Tubo Digestivo e a Alimentacao da Gitubarana, SALMINUS HILARII Val., 1829 (Notes on the Growth, Digestive Tract, and Food of Salminus hilarii Val., 1829), by Melquiades Pinto Palva, 23 pp., illus., printed in Portuguese. National Museum of the University of Brazil, Rio de Janeiro, D. F., Brazil.

BYPRODUCTS:

"Experience and Methods of Controlling Odors Associated with Fish Byproducts Plant at Gloucester," by Leonard D. Mandell, article, Journal of Boston Society of Civil Engineers, vol. 45, 1958, pp. 366-368, printed. Boston Society of Civil Engineers, 88 Tremont Temple, Boston, Mass.

"Fish Byproducts," article, Food Investigation 1957 (Report of the Food Investigation Board--Great Britain), pp. 21-22, printed. Department of Scientific and Industrial Research, Charles House, 5-11 Regent St., London S. W. 1, England, 1958. Discusses the value of fish meal as an ingredient in animal feed and some of the technological problems encountered in its production. Reports on the need for valid quality assessment tests; progress in the identification of chemical components of offensive odors; and results of experimental work done at a fish-meal pilot plant.

CALIFORNIA:

California Fish and Game, vol. 45, no. 4, October 1959, 141 pp., illus., printed. Department of Fish and Game, 722 Capitol Ave.,

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Sacramento 14, Calif. Includes, among others, the following articles: "California Sturgeon Tagging Studies," by Harold K. Chadwick; "The Use of Probability Sampling for Estimating Annual Number of Angler Days," by Norman Abramson and Joyce Tolladay; and "Striped Bass Introduced into the Colorado River," by J. A. St. Amant.

CANADA:

Canadian Fisheries Annual, Vol. 8, 1959, 128 pp., illus., printed. National Business Publications, Ltd., Gardenvale, Quebec, Canada. Includes these feature articles: "Canada's Fisheries in 1958," by Mark Ronayne; "World Fisheries in 1958," by D. B. Finn; "Canadian Fisheries Research in 1958," by J. L. Kaak; and "Trends and Developments in Fishery Package Design," by Leonard Arthur Wheeler. In addition, special sections contain complete statistics of Canada's commercial fisheries, a directory of fishing companies and their products, buyer's guide, and a list of Federal and Provincial Government fishery officials.

Fisheries Statistics of Canada (Nova Scotia), 1957, 65 pp., printed in French and English, C\$1. Queen's Printer and Controller of Stationery, Ottawa, Canada, September 1959. Consists of tables giving the quantity and value of fish and shellfish landed in Nova Scotia, 1939-1957; the quantity and value of fishery products by species and fisheries districts, 1956-1957; and capital equipment employed and number of persons engaged in the primary operations by fisheries districts, 1956-1957.

"The Freshwater Fisheries of Manitoba," by J. E. Steen, article, Trade News, vol. 12, no. 3, September 1959, pp. 8-10, illus., printed. Director of Information and Educational Service, Department of Fisheries, Ottawa, Canada. Although often considered an exclusively agricultural province, Manitoba possesses an important fresh-water fishery, with 5,000-6,000 fishermen landing about 30 million pounds of fish annually, valued at 5-7 million Canadian dollars. Of 75 different species inhabiting the province's lakes and rivers, 15 are of commercial importance. These include principally pickerel, whitefish, sauger, pike, and tullibee. Supervision and inspection of the fishery is maintained by Provincial and Federal agencies.

Progress Reports of the Pacific Coast Stations, no. 113, 18 pp., illus., printed. Fisheries Research Board of Canada, Ottawa, Canada, September 1959. Among the articles included are: "The Use of Condensed Herring Solubles in Turkey Poul Rattons," by B. E. March and others; "Observations on Adult Pink Salmon Behaviour" and "Note on the Behaviour of Pink Salmon Fry," by W. Percy Wickett; "The Occurrence of Lesser Lancet Fish (*Anotopterus pharao* Zugmayer) in the Northeast Pacific Ocean," by G. T. Taylor; and "The Primary Productivity and Fertility of the Northeast Pacific and the British Columbia Coastal Waters," by J. D. H. Strickland.

CANNED FISH:

Crystals in Canned Sea Foods and Fish, by C. A. Greenleaf and R. P. Farrow, Circular 18-L Revised, 4 pp., printed. Washington Research Laboratory, National Canners Association, 1133 20th St., N. W., Washington, D. C., September 1959. Discusses the occasional appearance in canned fishery products of crystals of magnesium ammonium phosphate hexahydrate, or struvite. These crystals are harmless, odorless, and tasteless and are formed after canning from substances naturally present in the fish. Identification can easily be made since the struvite crystals are soft and can be dissolved by boiling in vinegar or lemon juice.

CHILLING AND FREEZING:

"Research on Chilling and Freezing of Fish," by Af. F. Bramsnaes, article, Sætryk af Kulde Dansk Koleteknisk Tidsskrift, vol. 12, no. 6, 1958, pp. 61-64 and vol. 13, no. 1, 1959, pp. 5-9, printed in Danish. Fiskeriministeriets Forsøgslaboratorium, Copenhagen, Denmark.

COD:

"Dos Brotes de Envenamiento por Consumo de Bacalao Salado en Puerto Rico" (Two Cases of Poisoning from Eating Salted Codfish in Puerto Rico), by A. T. Masi and others, article, Boletín de la Oficina Sanitaria Panamericana, vol. 46, no. 3, May 1959, pp. 465-471, printed in Spanish with English summary. Pan American Health Organization, 1501 New Hampshire Ave., N. W., Washington, D. C.

"The Technological Characteristics of the Baltic Sea Codfish," by P. M. Pozhagina, article, Izvestia Akademii Nauk Latvskoi, no. 3, 1954, pp. 85-91, printed in Russian. Latvijas Padomju Socialistiskas Republikas Zinatnu Akademijs, Riga, Latvia.

CONSERVATION:

Environmental Conservation, by Raymond F. Dasmann, 307 pp., illus., printed, \$6.50. John Wiley & Sons, Inc., 440 4th Ave., New York 16, N. Y., 1959.

The Status of Legal Restrictions in Fish Conservation, by R. W. Eschmeyer, 8 pp., printed. (Reprinted from Proceedings 38th Convention, International Association of Game, Fish and Conservation Commissioners, 1949.) Tennessee Valley Authority, Norris, Tenn., 1949.

DENMARK:

Fiskeriberetning for Året 1958 (The Ministry of Fisheries Annual Report for 1958), 151 pp., illus., printed in Danish with English summary. Fiskeriministeriet, 1 Kommission Hos G. E. C. Gad, Copenhagen, Denmark. A report on the Danish fishing industry for the year 1958. Includes data on number of fishermen employed; fishing vessels; gear and nets; landings of fish and shellfish; trout produced in ponds; production of canned, smoked, and filleted fish; production of fish meal and oil; and foreign trade in fishery products.

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DEODORIZATION:

Deodorization and Storage of Fish, Shellfish, and Meat, by Seiji Tada, Japanese Patent No. 1583, March 7, 1958, printed. Japanese Patent Office, Tokyo, Japan.

DIRECTORIES:

Scandinavian Fishing Year-Book, 1958-59 (Year-Book and Directory for the Fish Trade), edited by Jorgen Frimodt, 416 pp., illus., printed, 50 kroner (US\$7.50). Jorgen Frimodt, 59-61 Nyhavn, Copenhagen K, Denmark. A well-organized and useful handbook for the international fishing trade. Contains chapters on the world catch and production of fish and shellfish, European fishing in the Atlantic, fish names in various languages together with their scientific names, seal hunting in the Arctic, and world whaling. Sections on Denmark, Faroe Islands, Norway, Sweden, Finland, Iceland, Germany, Netherlands, Belgium, and United Kingdom contain articles on the fisheries, addresses of embassies and legations, names of importing and exporting firms, lists of builders and repair yards for fishing craft, and other trade data. Included are lists of importers and exporters throughout the world. The appendix contains a list of port-distinguishing letters of fishing vessels and a directory of individual vessels under registry of the above-mentioned countries, also contains a large map of fishing banks and ports of the North Atlantic.

ELECTRICAL FISHING:

"The Electric Mid-Water Trawl," by Jay Russell, article, Maine Coast Fisherman, vol. 13, June 1959, p. 12, printed. Maine Coast Fisherman, 22 Main St., Camden, Me.

ENZYMES:

"Enzymes Process Fish," article, Chemical and Engineering News, vol. 37, April 13, 1959, p. 27, printed. Chemical and Engineering News, American Chemical Society, 1801 K St., N. W., Washington 6, D. C.

FISH CULTURE:

"The Significance of Fish Culture as an Integral Part of Rural Economy in Indonesia," by M. Ahjar and R. Tasripin, paper, Proceedings Indo-Pacific Fisheries Council, 6th Session, September 30-October 14, 1955, Section II, pp. 303-306, printed. Food and Agriculture Organization of the United Nations, Regional Office for Asia and the Far East, Bangkok, Thailand, 1956.

FISH LIVER:

"A Comparative Study of Nucleotide Metabolism in Fish Liver," by R. J. Forrest and R. G. Hansen, article, Canadian Journal of Biochemistry and Physiology, vol. 37, June 1959, pp. 751-762, printed. Canadian Journal of Biochemistry and Physiology, Division of Administration, The National Research Council, Sussex St., Ottawa, Canada.

FISH LIVER OIL:

Deodorization of Fish-Liver Oil, by Masakuni Kanai, Japanese Patent No. 3832, May 12, 1958, printed. Japanese Patent Office, Tokyo, Japan.

FISH MEAL:

"The Effect of Prolonged Heating on Various Nutritive Factors in Fish Meal," by A. N. Rowan, article, Annual Report, Fishing Industry Research Institute, April-December 1956, no. 10, pp. 28-29, printed. Fishing Industry Research Institute, Cape Town, Union of South Africa, 1957.

"New Fish Meal Tested in Broiler Rations," by Elbert J. Day and James E. Hill, article, Poultry Science, vol. 38, May 1959, pp. 556-559, printed. Poultry Science Association, Kansas State College, Manhattan, Kans.

"The Origin and Elimination of Offensive Odors in Fish Meal Production," by Hans H. Kurmeier, article, The South African Shipping News and Fishing Industry Review, vol. 14, no. 9, September 1959, p. 53, printed. Odhams Press, South Africa (Pty.) Ltd., Box 2598, Cape Town, Union of South Africa. Discusses the causes of offensive odors produced during the manufacture of fish meal and the ineffectiveness of the present method of elimination by water scrubbing. The author describes a new process which involves precipitation of the undesirable substances by means of mixing with boiler fluegas.

FISH OILS:

"The Fungicidal Activity of the Unsaturated Fatty Acids and Quaternary Salts Prepared from Fish Oils," Boris Sokoloff and others, article, Journal of the American Oil Chemists' Society, vol. 36, June 1959, pp. 234-237, printed. The American Oil Chemists' Society, 35 E. Wacker Dr., Chicago 1, Ill.

FLORIDA:

Reconnaissance Survey of the Bathymetry of the Straits of Florida, by Violet B. Siegler, Technical Report no. 59-3, 12 pp., illus., processed. The Marine Laboratory, University of Miami, #1 Rickenbacker Causeway, Miami 49, Fla., 1959.

Straits of Florida Physical and Chemical Data, May 1957-November 1958, by M. P. Wennekens and others, Technical Report 58-5, 83 pp., illus., processed. The Marine Laboratory, University of Miami, #1 Rickenbacker Causeway, Miami 49, Fla., 1958.

FOOD AND AGRICULTURE ORGANIZATION:

Current Bibliography for Aquatic Sciences and Fisheries (Supplementary References to 1957 Publications Not Previously Included), 324 pp., processed. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy, 1959.

FAO Picture Sheet No. 9--Fishing Boats, 2 pp., illus., printed. Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy. A poster-size sheet showing photos of fishing vessels in many countries. The theme of the text is "The Better Boat, the Greater the Catch," and describes the technical problems met by FAO experts in efforts to improve the fisheries in a number of undeveloped nations.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Fishing Gear Used in Spanish Coastal Lagoons, by Fernando Lozano Cabo, General Fisheries Council for the Mediterranean, Studies and Reviews No. 9, November 1959, 35 pp., illus., processed, GFCM Secretariat, Food and Agriculture Organization of the United Nations, Rome, Italy. This study was originally presented at the Fifth Meeting of the General Fisheries Council for the Mediterranean, Rome, October 13-18, 1958, as technical paper no. 26. Describes fishing methods as practiced in fresh- and salt-water lagoons in Valencia, Murcia, Galicia, and other parts of Spain. The small section of text is followed by a large number of prints reproducing both contemporary photos and some quaint wood-cuts taken from Historical Dictionary of National Fishing Gear, by Antonio Sañer Reguart, published between 1791 and 1795 in Madrid. Types of gear include seines, sardine gill nets, trammel nets, cast nets, shrimp nets, eel spears, clam dredges, eel traps, permanently-installed traps made of reeds, and eel tanks.

Report of the Technical Meeting on Costs and Earnings of Fishing Enterprises, 8-13 September 1958, 195 pp., processed, Economics and Statistics Branch, Fisheries Division, Food and Agriculture Organization of the United Nations, Rome, Italy. Includes proceedings, papers presented, and discussions held under each of five agenda items covered during a meeting of qualified experts in fishery economics held in London. The agenda items consisted of: purposes of cost and earnings studies in fisheries--the point of view of government and other public authorities and those in the fishing industry; concepts, definitions, and conventions in different countries, and general conclusions; merits of different kinds of investigational methods; methods of analysis of collected accounts; and effect of regulation of the fisheries on costs and earnings of fishing enterprises.

FREEZING:

"Fish Freezing: Methods and Equipment in Commercial Use," by Joseph W. Slavin, article, Industrial Refrigeration, vol. 137, no. 3, September 1959, pp. 18-19, 22-24, illus., printed. Industrial Refrigeration, Nickerson & Collins Co., 433 N. Waller Ave., Chicago 44, Ill. Reviews current methods of freezing, handling, storage, and packaging of the 350 million pounds of frozen fishery products produced in the United States annually. "Differences in the composition of the various species of fish harvested in the United States, and the differences in marketing requirements have necessitated consideration of the specific individual product in the selection of packaging materials and in the design and application of equipment for freezing and cold storage," states the author in summary.

"Freezing and Cold-Storage," article, Food Investigation 1957, pp. 10-12, printed. Department of Scientific and Industrial Research, Charles House, 5-11 Regent St., London S. W. 1, England, 1958.

FRESH-WATER FISH:

"Some Young Fresh-Water Fishes of New York," by Edward C. Raney, article, The New York

State Conservationist, vol. 14, no. 1, Aug.-Sept. 1959, pp. 22-28, illus., printed, single copy 50 cents. The Conservationist, Room 335, State Campus, Albany, N. Y. Describes the early stages in the life history of some of New York's fresh-water fish: the pike family, eel, bullhead, sucker, white perch, carp, yellow perch, and pike perch. The bass family, smelt, shad, sheepshead, striped bass, salmon, and trout are also described.

GROUND FISH:

A Report on Dehydrated Ground Fish, by William A. Snyder, 2 pp., printed. (Reprinted from American Fur Breeder, April 1959, pp. 14, 44.) American Fur Breeder, Fur Farm Publications, 405 E. Superior St., Duluth, Minn.

HALIBUT:

Regulation and Investigation of the Pacific Halibut Fishery in 1958, no. 27, 20 pp., illus., printed. International Pacific Halibut Commission, Seattle, Wash., 1959. A brief report of the accomplishments of the Commission during 1958 covering its historical background, activities during the year, 1958 regulations, statistics of the fishery, catch per unit of fishing effort, composition of the catches, growth studies, tagging experiments, and studies of halibut below commercial size.

HERRING:

"Om Bestanden av Atlanto-Skandisk Sild" (On Ocean Supply of Atlantic and Scandinavian Herring), by J. J. Marti, article, Fiskets Gang, vol. 45, no. 38, September 17, 1959, pp. 522-525, illus., printed in Norwegian. Fiskets Gang, Postgiro Nr. 691 81, Bergen, Norway.

The Influence of Gibbing on the Ripening of Maates Cured Herring, by A. F. M. G. Luijpen, 91 pp., printed in Dutch with English summary. Jacob Catslaan 28, Driehuis (Velsen), The Netherlands, 1959.

"Sammenliknende Undersøkelser Vintersild-Seasonen 1959 over Fangstresultatene ved Bruk an Snurpenøter av Kunstfibre (Nylon/Terylene) Kontra Snurpenøter av Bomull" (Comparison of Research on Winter Herring Catch 1959 Season with Use of Purse Seine of Synthetic Fiber Against Purse Seine of Cotton), article, Fiskets Gang, vol. 45, no. 40, October 1, 1959, pp. 550-558, printed in Norwegian. Fiskets Gang, Postgiro Nr. 691 81, Bergen, Norway.

"Vintersildfiskets Lønnsomhet 1958" (Production of Winter Herring Fishery 1958), by Georg Opedal, article, Fiskets Gang, vol. 45, no. 37, September 10, 1959, pp. 502-511, printed in Norwegian. Fiskets Gang, Postgiro Nr. 691 81, Bergen, Norway.

INTERNATIONAL GEOPHYSICAL YEAR:

The International Geophysical Year in Retrospect, by Wallace W. Atwood, Jr., Department of State Publication 6850, 8 pp., illus., printed, 10 cents. (Reprinted from the Department of State Bulletin, May 11, 1959.) Public Services Division, Bureau of Public Affairs, Department of State, Washington 25, D. C., July 1959. (For sale by

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the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.)

IRRADIATION PRESERVATION:

Experiments on the Irradiation of Fish with 4 Mev Cathode Rays and Cobalt Gamma Rays, by J. M. Shewan and J. Liston, D.S.I.R. Food Investigation Memoir No. 1204, 16 pp., printed, Department of Scientific and Industrial Research, Charles House, 5-11 Regent St., London S. W. 1, England. A paper presented at the Second United Nations International Conference on the Peaceful Uses of Atomic Energy, June 3, 1958.

"Production and Identification of a Green Pigment Formed During Irradiation of Meat Extracts," by J. B. Fox, Jr., Theodora Strehler, Carl Bernofsky, and B. S. Schweigert, article, Journal of Agricultural and Food Chemistry, vol. 6, September 1958, pp. 692-696, printed, Journal of Agricultural and Food Chemistry, American Chemical Society, 1801 K St., N. W., Washington 6, D. C.

JAPAN:

Bulletin of the Faculty of Fisheries, Hokkaido University, vol. 10, no. 1, May 1959, 84 pp., illus., printed in Japanese with summaries in English. Faculty of Fisheries, Hokkaido University, Hakodate, Japan. Contains, among others, the following papers: "An Experiment on a Mid-Water Trawl. VI--Practical Fishing Experiment," by Kiichiro Kobayashi and Naiochi Inoue; "Studies on the Fishing Grounds," by Tatsuaki Maeda and others; "Biochemical Studies on Squid Meat Food Poisoning. III--The Effect of Amines of Squid Meat on the Activity of Human Serum Acetylcholinesterase," by Kiichi Murata and Atsushi Iida; "Studies on the Fishing Grounds," by Sakuzo Nishiyama and others; "Quality of Flatfish from Hakodate. Part 3--The Factors Deciding the Quality. 1--Relations Between the Quality and Features, Ecological and Morphological," by Keiichi Oishi; and "Chemical Studies on Marine Algae. XII--The Free Amino Acids in Several Species of Marine Algae," by Mitsuzo Takagi and Mitsuo Kuriyama.

Bulletin of the Faculty of Fisheries, Hokkaido University, vol. 10, no. 2, August 1959, 90 pp., illus., printed in Japanese with English abstracts. Faculty of Fisheries, Hokkaido University, Hakodate, Japan. Contains, among others, these articles: "Biochemical Studies on Squid Meat Food Poisoning. IV--The Inhibition of Human Serum Acetylcholinesterase by the Amines of Squid Meat, Beef, and Hog Flesh," by Kiichi Murata and Atsushi Iida; "Results of Fishing Experiments with Trinal Gill Nets," by Hideo Nakamura and Giichi Kawasaki; "Quality of Flatfish from Hakodate. Part 3--The Factors Deciding the Quality. (2) Relations Between the Quality and Ordinary Chemical Constituents," by Keiichi Oishi; and "Utilization Value of Fishes Caught Abundantly in Waters Around Hokkaido as Raw Material for Fish Jelly Products ('Kamaboko' or 'Chikuwa')--I," by Eiichi Tanikawa and Yutaka Fujii.

Statistic Tables of Fishing Vessels (as of the end of 1958), General Report No. 11, 239 pp., illus., printed in Japanese and English. Japanese Fisheries Agency, Tokyo, Japan. An annual report containing data on the various types of Japanese fishing craft, both powered and nonpowered, as obtained by a fishery registration system. Statistical tables are shown by type of engine, type of fishery, and prefecture. According to the report, "statistics seem to show that the Japanese fishing fleet has not only restored its prewar status but increased its capacity rapidly after the War."

Tokai Regional Fisheries Research Laboratory, 8 pp., illus., printed. Tokai Regional Fisheries Research Laboratory, Tsukishima, Chuo-ku, Tokyo, Japan, 1958.

KELP:

"Kelp, Giant Among the Algae," by Hazel Mohler, article, Nature Magazine, vol. 52, no. 8, October 1959, pp. 406-408, illus., printed. American Nature Association, 1214 16th St., N. W., Washington 6, D. C. A clear exposition of the natural history and practical uses for the *Macrocystis*, *Nereocystis*, and other common forms of kelp which grow so plentifully along our Pacific Coast. The *Macrocystis* is not only the longest of all known plants, sometimes attaining a length of 1,000 feet, but it also acts as a natural buoy to warn vessels of nearby shoal water. A reportedly succulent pickle can be made from the *Nereocystis*. Kelp of various types, formerly harvested for its iodine content, is now used in the manufacture of sodium alginate, a gelatinous binder and emulsifying agent, agricultural fertilizers and animal feeds. And in nature, kelp not only provides food for countless aquatic animals but also purifies the waters and enhances the oxygen supply.

KENTUCKY:

Annual Report, Department of Fish and Wildlife Resources, Fiscal Year 1952-53, 13 pp., processed. Department of Fish and Wildlife Resources, Frankfort, Ky.

KENYA:

Report on Kenya Fisheries, 1958, 20 pp., printed, 2s (about 28 U. S. cents). Ministry of Forest Development, Game and Fisheries, Fisheries Division, Nairobi, Kenya, 1959. Reviews the work done on inland fisheries development, a fish culture farm, a trout hatchery, and the trout rivers. The section on sea fisheries covers fresh, frozen, and chilled fish; marketing and cold storage; retail facilities; dried fish; green turtles; and crawfish. Fishing investigations and gear development are discussed and several tables on imports and catch statistics are included.

LAW OF THE SEA CONFERENCE:

United Nations Conference on the Law of the Sea, A/CONF.13/37, vol. I: Preparatory Documents (Geneva, Feb. 24-Apr. 27, 1958), 340 pp., printed, US\$3.50, Apr. 1959, (Sales No.: 58.V.4, Vol. I). United Nations, New York, N. Y. (For sale by International Documents Service, Columbia University Press, 2960 Broadway, New York 27,

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

N. Y.) Includes information on economic development of fisheries; comments by governments on law of the sea; fishing methods; and territorial waters.

MARINE RESEARCH:

The Airplane as an Instrument in Marine Research, Part One: Dinoflagellate Blooms, by Robert M. Ingle, Robert F. Hutton, Harry E. Shafer, Jr., and Robert Goss, Special Scientific Report No. 3, 27 pp., illus., processed, Florida State Board of Conservation, Marine Laboratory, St. Petersburg, Fla., September 1959.

NEW ZEALAND:

Report on Fisheries for 1958, 41 pp., printed, Government Printer, Wellington, New Zealand, 1959. A comprehensive report on New Zealand's fisheries containing sections on spiny lobsters, fishing vessels and personnel, fish landings by ports and species, methods of capture, foreign trade, fish-liver oil, whaling, rock oysters, dredged oysters, whitebait fishery, and freshwater fisheries. Also discusses fresh-water and marine research, Fishing Industry Advisory Council, and Legislation. A list of scientific names of fish and shellfish is included with a number of statistical tables giving detailed data on the fisheries.

NORTH ATLANTIC AREA:

Seefischerei und Fischereipolitik im Nordatlantischen Raum (Marine Fisheries and Governmental Fishery Policy in the North Atlantic Area), by Wilhelm Blanke, 232 pp., illus., printed in German, DM 45 (about US\$10.72). Verlag Krogers Buchdruckerei, Hamburg-Blankenese, Germany, 1959. After a brief reference to the extent of the commercial fisheries throughout the world, this book discusses the participation of various nations in prosecuting the fisheries in all areas of the North Atlantic. It describes quantities of fishery products harvested, trade in fishery products, and the nature of facilities used such as number of vessels, kinds and amounts of gear, harbor facilities, etc. The book also attempts to give some idea of governments' policy with respect to fisheries. It mentions aid given to the fishery industry in the form of research, subsidies, etc., and also mentions international treaty aspects of governments' relations in the North Atlantic Area. This picture and the extent of individual commercial fisheries in the North Atlantic is given for 22 nations, each in a separate section in Part II of the book. Many of these individual sections were written by contributors from the country concerned, which should help in providing a sound and accurate description on the subject for each country.

--W. H. Stolting

NUTRITION:

"Nutritive Value of Canned Meat," by P. L. Sawant and N. G. Magar, article, Journal of Scientific and Industrial Research (India), vol. 17C, 1958, pp. 189-191, printed, Journal of Scientific and Industrial Research, Old Mill Rd., New Delhi 2, India. Describes how canned fish was

packed in hot peanut oil and stored at 27°, 37°, and 43° C. for 4 to 12 months. Results showed that soluble protein, amino acids, thiamine, riboflavine, and niacin all decreased; the changes were greater with longer time and higher temperature. The peroxide number of the muscle fat and of the covering oil increased after 4 months' storage.

Nutritive Value of Fish from Michigan Waters, by Ruth L. Ingalls and others, Technical Bulletin 219, 24 pp., printed, Michigan State College, Agricultural Experiment Station, East Lansing, Mich., May 1950.

Studies on the Nutritive Value of Lipids X--Scurvy Forming Activity of Esters of Fatty Acids with Higher Alcohols upon the Rats, by Takashi Kaneda and Kisei Sakurai, 9 pp., illus., printed in Japanese with English abstracts. (Reprinted from Bulletin of the Japanese Society of Scientific Fisheries, vol. 19, no. 12, April 1954, pp. 1168-1175.) Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

OCEANOGRAPHY:

The Floors of the Oceans I--The North Atlantic, by Bruce C. Heezen, Marie Tharp, and Maurice Ewing, Special Paper 65, 134 pp. of text and 11 charts, illus., printed, The Geological Society of America, 419 W. 117th St., New York 27, N. Y., April 11, 1959.

PARASITES:

Studies on Helminth Parasites from the Coast of Florida. III--Digenetic Trematodes of Marine Fishes from Tampa and Boca Ciega Bays, by Franklin Sogandares-Bernal and Robert F. Hutton, Contribution No. 19, 10 pp., illus., printed. (Reprinted from The Journal of Parasitology, vol. 45, no. 3, June 1959, pp. 337-346.) Florida State Board of Conservation Marine Laboratory, Maritime Base, Bayboro Harbor, St. Petersburg, Fla.

POISONOUS FISH:

Report of a Survey of the Fish Poisoning Problem in the Marshall Islands, by A. F. Bartsch, R. H. Drachman, and E. F. McFarren, 128 pp., illus., processed. Division of Sanitary Engineering Services and Communicable Disease Center, Bureau of State Services, Public Health Service, U. S. Department of Health, Education, and Welfare, Washington 25, D. C., January 1959.

PRESERVATION:

"Technical Aspects of the Commercial Use of Anti-Microbial Chemicals as Food Preservatives," by M. Ingram, article, Chemistry and Industry, no. 18, May 2, 1959, pp. 552-557, printed, Chemistry and Industry, 14 Belgrave Square, London S. W. 1, England.

Torry Research, 1958, on the Handling and Preservation of Fish and Fish Products (Report of the Director of the Torry Research Station), 39 pp., printed, 2s. 6d. (about 35 U. S. cents). Her Majesty's Stationery Office, 13a Castle St.,

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Edinburgh 2, Scotland, 1959. Describes accomplishments in research during 1958 on improvement in quality of iced fish, freezing and cold-storage, smoke curing, drying, canning, fishery byproducts, bacteriology, and biochemistry. Includes work on objective assessment of freshness, preservative ices, air-blast freezing, electrostatic smoking, "browning" of dehydrated fish, reduction of free liquor in herring packs, fish meal pilot plant, marine bacteriophages, fish muscle enzymes, and many others.

PROTEINS:

"Biological Value of the Protein in Some Seafoods Used in Spain," by A. Pujol and G. Varela, article, *Anales de Bromatologia*, vol. 10, 1958, pp. 437-478, printed in Spanish. Sociedad Espanola de Bromatologia, Ciudad Universitaria, Edificio Facultad de Farmacia, Madrid, Spain.

"Proteins in Fish Muscle. 15--Note on the Preparation of Actin From Cod Muscle with Potassium Iodide," by J. R. Dingle, article, *Journal of the Fisheries Research Board of Canada*, vol. 16, March 1959, pp. 243-245, printed. Journal of the Fisheries Research Board of Canada, Queen's Printer and Controller of Stationery, Ottawa, Canada.

RADIOACTIVITY:

"Studies of the Radioactive Materials in the Radiologically Contaminated Fishes. IV--Group Separation Analysis of the Radioelements in a Contaminated Bigeyed Tuna, *Parathunnus mebachi*," by Kazuo Shirai and Masamichi Saiki, article, *Bulletin of the Japanese Society of Scientific Fisheries*, vol. 23, no. 11, 1958, pp. 723-728, illus., printed in Japanese with English abstract. Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

RESEARCH VESSEL:

"The Design of a Research Stern Fishing Trawler--Part II," by J. C. Esteves Cardoso and C. R. Caldiera Saraiva, article, *World Fishing*, vol. 8, no. 10, October 1959, pp. 59-60, 63-64, illus., printed. World Fishing, John Trundell, Ltd., St. Richards House, Eversholt St., London N. W. 1, England. Part II of a paper read at the meetings of the Institution of Naval Architects held in Lisbon in June 1959. Presents a detailed, critical description of the design and expected performance of a research vessel being built for the Portuguese Association of Trawler Owners. Discusses the main characteristics of the vessel--over-all length 186 feet, 3 inches; beam 35 feet; depth 15 feet/21 feet; displacement 1,300 metric tons; and hold capacity 4,340 cubic feet of frozen fish or 5,944 cubic feet of wet fish. The general arrangement includes a deckhouse with lateral passages to facilitate conveying the catch to the hold. The design features a large broad hanging stern with small immersion and a large breadth fore and aft at the waterline to ensure stability. Economy of weight is achieved by the extensive use of welding and the installation of a versatile high-speed power plant. The electrical installations are run by alternating current, except the winch

motor, which is run by direct current. A high-speed twin-engine Diesel plant provides propulsion, giving full power for trawling and towing. Drawings of the vessel's layout and propulsion system are shown.

SALMON:

Food of Salmonid Fishes of the Eastern North Pacific Ocean, by George H. Allen and William Aron, Reference 57-21, 27 pp., illus., processed. Department of Oceanography, University of Washington, Seattle 5, Wash., August 1957.

SALMON:

"The Salmon's Growing Problem in B. C.," article, *Trade News*, vol. 10, no. 4, October 1957, pp. 8-9, illus., printed. Director of Information and Educational Service, Department of Fisheries, Ottawa, Canada. Discusses the construction of fishways, pipelines, and control dams to solve the problems posed to the British Columbia salmon fisheries by the discharge of industrial wastes into waterways and the construction of hydroelectric dams.

SALMON EGGS:

"Egg Lipids of a Salmon, *Oncorhynchus keta* I--Fatty Oils from Salmon Eggs," by Kolchi Zama and others, article, *Bulletin of the Japanese Society of Scientific Fisheries*, vol. 24, nos. 6 and 7, 1958, pp. 569-572, illus., printed in Japanese with English abstract. Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

SARDINES:

"Experiments in Cooking Sardines--II," by R. Meesemaecker and Y. Sohler, article, *Food Manufacture*, vol. 34, May 1, 1959, pp. 193-196, 204, printed. Food Manufacture, Leonard Hill, Ltd., Eden St., London N. W. 1, England.

SCALLOPS:

A New Fishery for Scallops in Western Florida, by Harvey R. Bullis, Jr., and Robert M. Ingle, 4 pp., printed. (Reprinted from *Proceedings of the Gulf and Caribbean Fisheries Institute*, Eleventh Annual Session, November 1958, pp. 75-78.) Florida State Board of Conservation, Marine Laboratory, St. Petersburg, Fla.

Offshore and Newfoundland Scallop Explorations, by L. M. Dickie and L. P. Chiasson, General Series Circular No. 25, March 1955, 4 pp., illus., printed. Fisheries Research Board of Canada, Atlantic Biological Station, St. Andrews, New Brunswick, Canada. To assess the prospects of an offshore scallop fishery, the Fisheries Research Board of Canada in cooperation with the Department of Fisheries, began explorations on the banks off Nova Scotia and Newfoundland in 1953. Three vessels were chartered for this work and commercial fishermen were encouraged to fish these areas. Explorations continued for about one year, but results did not indicate any extensive scallop beds on the Newfoundland and Nova Scotia Banks.

SEAWEED:

"Chemical Studies on Volatile Constituents of Seaweed. On Volatile Constituents of *Digenia*

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simplex," by Teruhisa Katayama, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 24, no. 3, 1958, pp. 205-208, printed. Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

"Studies on the Bleaching and Utilization of the Seaweed 'Gulaman-Dagat' (*Gracilaria confervoides*), by J. I. Sult, L. G. Salcedo, and P. C. Panganiban, paper, Proceedings Indo-Pacific Fisheries Council, 6th Session, September 30-October 14, 1955, section II, pp. 280-283, processed. Food and Agriculture Organization of the United Nations, Rome, Italy, 1956.

"Studies on the Vitamins of Seaweeds. I--Folic Acid and Folinic Acid," by Akio Kanazawa and Daichi Kakimoto, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 24, nos. 6 and 7, 1958, pp. 573-577, illus., printed in Japanese with English abstract, figure, and tables. Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

SEINING:

"Danish Seining at Cheticamp," by G. J. Gillespie, article, Trade News, vol. 12, no. 3, September 1959, pp. 3-5, illus., printed. Director of Information and Educational Service, Department of Fisheries, Ottawa, Canada. The story of the fishermen of a small community on the west coast of Cape Breton Island who have worked together with a fishery cooperative to increase production fourfold within the past decade. With the development of Danish seining, the door has been opened to an ever-expanding diversified fishery. If this method of fishing can be utilized for catching cod and haddock, in addition to the usual flatfish, a secure future lies ahead for the Nova Scotia fishing industry.

SHARKS:

Shark Attack, by V. M. Coppleson, 281 pp., illus., printed. Angus and Robertson, Ltd., 89 Castlereagh St., Sydney, Australia, 1958.

SHRIMP:

Notes on *TRACHYPENEUS* (*TRACHYSALAMBRIA*) *SIMILIS* (Smith), in the Tortugas Shrimp Fishery, by Bonnie Eldred, Contribution No. 26, 2 pp., printed. (Reprinted from the Quarterly Journal of the Florida Academy of Science, vol. 22, no. 1, 1959.) Florida State Board of Conservation, Marine Laboratory, St. Petersburg, Fla.

Preliminary Analysis of Tortugas Shrimp Sampling Data, 1957-58, by Robert M. Ingle and others, Technical Series No. 32, 43 pp., illus., printed. Florida State Board of Conservation, Marine Laboratory, St. Petersburg, Fla., September 1959. A report on surveys conducted in compliance with a Florida Statute passed in 1957, aimed at conservation of the pink spotted shrimp of Dry Tortugas. Twelve sampling stations were established in the controlled area off the Florida keys. When the results of sampling show that shrimp in the area are smaller than 50 to the pound (heads off), the area is

closed to commercial fishing. The greater part of this report consists of statistical tables showing detailed findings of this continuing survey.

SOUTH PACIFIC ISLANDS:

"Some Notes on Fisheries in American Samoa, Fiji, and New Caledonia," by H. Van Pel, article, SPC Quarterly Bulletin, vol. 9, no. 3, July 1959, pp. 26-27, illus., printed, single copy 30 U. S. cents. South Pacific Commission, Box 5354, G. P. O., Sydney, Australia.

SPOILAGE:

"Spoilage of Fish in the Vessels at Sea: 6--Variations in the Landed Quality of Trawler-Caught Atlantic Cod and Haddock During a Period of 13 Months," by C. H. Castell, Jacqueline Dale, and Maxine F. Greenough, article, Journal of the Fisheries Research Board of Canada, vol. 16, March 1959, pp. 223-233, printed. Journal of the Fisheries Research Board of Canada, Queen's Printer and Controller of Stationery, Ottawa, Canada.

TENNESSEE VALLEY AUTHORITY:

History of Fish and Fishing in Norris--A TVA Tributary Reservoir, by Charles J. Chance, Contribution No. 116, 12 pp., illus., printed. (Reprinted from Proceedings of the Twelfth Annual Conference, Southeastern Association of Game and Fish Commissioners, pp. 116-127.) Southeastern Association of Game and Fish Commissioners, Columbia, S. C., 1958. Norris Reservoir, the first TVA tributary reservoir, completed in 1936, has a spillway surface area of 34,200 acres. Earliest fish inventory records indicated the presence of 65 indigenous species. Although several species were unable to cope with the reservoir environment, game and commercial, species generally have prospered in the reservoir. Fish tagging studies conducted annually on Norris for 14 years indicate the relative rate of harvest and the degree of dispersion of each species within the reservoir.

THAILAND:

Fisheries Statistics of Thailand, 1958, 53 pp., illus., processed in Thai and English. Statistics Section, Department of Fisheries, Ministry of Agriculture, Bangkok, Thailand, September 1959. Contains statistical tables showing landings of marine and fresh-water fish and shellfish with comparative data from previous years; price data for fresh and salted fish; fish pond production; foreign trade in fishery products; registered Thai fishing vessels; fishing gear; revenue from fishing industry; maps of fishing grounds; and other pertinent data.

TRADE LIST:

The Bureau of Foreign Commerce, U. S. Department of Commerce, Washington 25, D. C., has published the following mimeographed trade list. Copies may be obtained by firms in the United States from that office or from Department of Commerce field offices at \$2 each.

Oils (Animal, Fish, and Vegetable)--Importers, Dealers, Producers, Refiners, and Exporters,

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Federal Republic of Germany and West Berlin, 20 pp. (September 1959). List the names and addresses, size of firms, and types of products handled by each firm. Includes firms dealing in fish oils, fish liver oils, sperm oils, and whale oils.

Oils (Animal, Fish, and Vegetable)--Importers, Dealers, Producers, Refiners, and Exporters, Japan, 24 pp. (August 1959). Lists the names and addresses, size of firms, and types of products handled by each firm. Includes firms dealing in fish liver oils, fish oils, and whale oil.

TRAWLING:

"Surface and Mid-Water Trawling," by A. F. Aalberg, article, Kalomiehni Viesti, nos. 1 and 2, February 6 and March 16, 1958, printed in Finnish. Kalomiehni Viesti, Kotka, Finland.

TUNA:

Biochemical Study on Tuna, 7 pp., illus., printed. Fisheries Agency, Ministry of Agriculture and Forestry, Tokyo, Japan, September 1959. A paper presented at the Tuna Conference between the United States and Japanese Governments.

Inter-American Tropical Tuna Commission, Annual Report for the Year 1958, 121 pp., illus., printed in Spanish and English. Inter-American Tropical Tuna Commission, Scripps Institution of Oceanography, La Jolla, Calif. Contains the annual report of the Commission, which discusses the program and progress of investigations and publication of research results and a report of the Director on investigations during the year 1958. The Director's report presents the compilation of current statistics of total catch, amount and success of fishing, and abundance of the fish populations; present status of the tuna populations; potential fishing power of the tuna fleets; and other studies of tuna catch statistics. It also covers research on tuna population structure, migrations, and vital statistics; other aspects of tuna biology and behavior; investigations of physical, chemical, and biological oceanography and tuna ecology; and investigations of biology, ecology, and life history of bait fishes.

Study on Green Flesh, 23 pp., illus., printed. Fisheries Agency, Ministry of Agriculture and Forestry, Tokyo, Japan, September 1959. A paper presented at the Tuna Conference between the United States and Japanese Governments.

"Study on the Green Meat of Tuna," by Shuichi Hirao and others, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 24, no. 8, 1958, pp. 671-675, illus., printed in Japanese with English abstract. Japanese Society of Scientific Fisheries, c/o Tokyo Suisan Daigaku, Shiba-kaigandori 6-Chome, Tokyo, Japan.

UGANDA:

Annual Report of the Game and Fisheries Department (For the Period 1st July 1957 to 30th June, 1958), 101 pp., illus., printed. Government Printer, P. O. Box 33, Entebbe, Uganda, 1959. Part III describes the work of the Fish-

eries Division during the financial year 1958, including general statistics and information on supplies of fishing gear; fish production, consumption, and exports for 1957; boat building and mechanization of craft; fisheries research; and the crocodile industry. A section on the fisheries of Uganda by regions contains information on the industry at Lakes Albert, George, Edward, and Kyoga. Accomplishments in fish farming are also discussed. Other parts of the report concern game conservation.

UNITED KINGDOM:

The White Fish Industry, 46 pp., illus., printed. The White Fish Authority, Lincoln's Inn Chambers, 2/3 Cursitor St., London E. C. 4, England. An informative booklet for pupils and teachers dealing not only with white (or demersal) fish proper, but also with pelagic fish (other than herring) and with shellfish. Describes the history and scope of the British fishing industry, the species and quantities caught, fishing methods, fishing vessels and grounds, fishery research, distribution, processing, storage, marketing, and nutritive value.

U. S. S. R.:

Fishes--Dnieper River, by Aleksandr Ivanovich Ambroz, 408 pp., illus., printed in Russian. (An individual may borrow the copy on deposit at the Central Library, Department of the Interior, Washington 25, D. C. through his local library.)

Fishes--Russia, by P. G. Borisov and N. S. Ovsianikov, 283 pp., illus., printed in Russian. (An individual may borrow the copy on deposit at the Central Library, Department of the Interior, Washington 25, D. C., through his local library.)

VENEZUELA:

The Marine Communities of Margarita Island, Venezuela, by Gilberto Rodriguez, Contribution No. 236, 44 pp., illus., printed. (Reprinted from Bulletin of Marine Science of the Gulf and Caribbean, vol. 9, no. 3, September 1959, pp. 237-280.) The Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami, Fla. An analysis of the composition and arrangement of the littoral and sublittoral communities in a representative area of the Caribbean. Includes a summary of the most common forms of marine plants and invertebrates of Margarita Island.

VESSELS:

British Trawlers, by H. M. Le Fleming, 64 pp., illus., printed, 2s. 6d. (about 35 U. S. cents). Ian Allan, Ltd., Craven House, Hampton Court, Surrey, England. A directory of trawler owners and vessels in the United Kingdom. A short introduction describes the three classes of trawlers, methods of fishing, and types of engines used in trawlers.

VIETNAM:

Selected Articles on Fishing Industry in North Vietnam, JPRS: 655-D, 8 pp., processed, U. S. Joint Publications Research Service, Suite 300, 205 E. 42nd St., New York 17, N. Y., April 14,

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1959. Photocopies may be purchased from the Photoduplication Service, Library of Congress, Washington 25, D. C.) Includes translations of the following articles from *Non Lam*, no. 1, January 1959: "How to Increase the Catch of Salt-Water Fish," by Hoang Xuan Hai; and "Fresh-Water Fish Breeding During Winter-Spring Season," by Nguyen Sung.

VIRGINIA:

Treasures from the Sea, The Virginia Seafood Industry, by Robert S. Bailey, Educational Series No. 10, 24 pp., illus., processed. Virginia Fisheries Laboratory, Gloucester Point, Va., 1959. Easy and informative reading for the layman, this booklet tells the story of Virginia's fisheries from colonial times until the present day. Information is given on changes in value and composition of the catch, details of finfish, shellfish, and sport fisheries; and the role of the public in conservation and proper utilization of fishery resources. Tables and drawings depict average annual values and catches of five species between 1931-55, 1956 landings by gear, and other statistical data concerning Virginia's fishing industry.

WHALES:

"Treating and Processing of Whale Meat to Meat Products," by Otto Roemmele, article, *Die Fleischwirtschaft*, vol. 10, 1958, pp. 833-835, printed in German. Die Fleischwirtschaft, Verlagshaus Sponholz GmbH, Kockstrasse 60-61, Berlin SW68, Germany

WHALING:

"Whaling Operations in the Antarctic, Season 1958/59," article, *Norsk Hvalfangst-Tidende*, vol. 48, no. 9, September 1959, pp. 452-464, 467-468, 471-476, illus., printed in Norwegian and English. Norsk Hvalfangst-Tidende, Sandefjord, Norway. A survey of the whaling operations in the Antarctic in the season 1958/59 prepared for and submitted at the meeting of the International Whaling Commission in London in June 1959. Covers the most important regulations governing pelagic whaling in the season 1958/59 and gives the number of factory-ships and catching boats which have been engaged in pelagic whaling since 1945/46 and average gross tonnage. The catch and oil production of the individual expeditions, the output of byproducts, and related statistics concerning the whaling operations in the Antarctic during the season 1958/59 are presented.



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CANNED SALMON FEATURED IN COLOR FILMS AND RECIPE BOOKLET

Canned salmon can be the basis of good meals and intriguing and entertaining motion pictures. A three-unit story of salmon--two 14-minute sound-color films and a recipe booklet in color--were released January 15, 1960.



Salmon Cabbage Vinaigrette

The titles of the films, Salmon - Catch to Can, and Take a Can of Salmon, are descriptive of the subject matter. The first begins with the life cycle of the salmon and the three common ways of catching them and ends with getting the salmon into the can. The second "takes a can of salmon" and shows the attractive meals as housewives in six typical American cities prepare them.

Alaska is the site of filming of most of the first picture. Gill-netting, trolling, and purse-seining for salmon are shown in some detail. There are also scenes on salmon biology which should be especially interesting to science classes in grade or high schools. These are followed by several in-

plant sequences showing the canning of the product.

In the second film, six typical American cities are visited. Each visit is introduced by some exceptionally good pictures of the better-known landmarks. The cities are San Francisco, Seattle, Miami, Chicago, New Orleans, and New York. A favorite recipe, based upon historical or other characteristics of each city is developed in the film. For example, in San Francisco a can of salmon is utilized in an old Chinese recipe. In Seattle a can of salmon is converted into an attractive outdoor meal. All of the recipes shown in the Take a Can of Salmon film, and many others, are included in the recipe booklet which, incidentally, bears the same name as the film.

The motion pictures are so arranged that they can be used for two 14-minute showings or used in sequence for a 28-minute show. These films, as are most other Bureau films, are cleared for use on television.

The films and the recipe booklet are sponsored by the Canned Salmon Institute, Inc., and produced by the U. S. Bureau of Commercial Fisheries, under contract with Sun Dial Films, Inc., and M. P. O., both commercial motion picture producers in New York City. The films will be distributed on a free-loan basis through Bureau sources and the Bureau's 170 cooperating film libraries throughout the country. Applications for loan should be sent to the Visual Education Unit, U. S. Bureau of Commercial Fisheries, Post Office Box 128, College Park, Md. A catalog of other available fishery educational films is obtainable from College Park or from the U. S. Fish and Wildlife Service, Washington 25, D. C. You can buy the recipe booklet--Take a Can of Salmon--for 15 cents a copy from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C. There is a 25-percent discount on orders of 100 or more copies sent to one address.

